Railway Age Gazette

PUBLISHED EVERY FRIDAY AND DAILY EIGHT TIMES IN JUNE BY THE
SIMMONS-BOARDMAN PUBLISHING COMPANY
WOOLWORTH BUILDING, NEW YORK.

CHICAGO: Transportation Bldg. CLEVELAND: Citizens' Bldg.
LONDON: Queen Anne's Chambers, Westminster.

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Subscriptions, including 52 regular weekly issues and special daily editions published from time to time in New York, or in places other than New York, payable in advance and postage free:

United States and Mexico.....$5.00
Canada 6.00
Foreign Countries (excepting daily editions)..... 8.00
Single Copies.....15 cents each

Engineering and Maintenance of Way Edition and four Maintenance of Way Convention daily issues, North America, $1; foreign, $2.

Entered at the Post Office at New York, N. Y., as mail matter of the second class.

WE GUARANTEE, that of this issue 8,650 copies were printed; that of these 8,650 copies 7,335 were mailed to regular paid subscribers to the weekly edition, 155 were provided for counter and news companies' sales, 988 were mailed to advertisers, exchanges and correspondents, and 172 were provided for new subscriptions, samples, copies lost in the mail and office use; that the total copies printed this year to date were 258,100, an average of 9,218 copies a week.

The RAILWAY AGE GAZETTE and all other Simmons-Boardman publications are members of the Audit Bureau of Circulations.

VOLUME 59 JULY 9, 1915 NUMBER 2

Contents

*Illustrated.

Chaloner Whin is the latest train accident reported on by the British Board of Trade; and it is another case in which the inspector points out the need of a cab signal or its equivalent; but the recommendation is couched in the inspectors' customary mild language. Chaloner Whin is two miles south of York, on the North Eastern, which road has a considerable equipment of cab signals. The report is abstracted on another page. Incidentally it shows also the comparative uselessness of an apparatus to enable a signalman to put torpedoes on the rail opposite his cabin. In this case the engineman ran past distant and home signals set against him and was thrown off the track, just beyond the cabin, at a movable frog, which was open because the signal man tried to move it when it was clogged with snow. The rule prohibits signalmen from thus introducing an obstruction—moving the frog was an obstruction—when a train is known to be approaching; it requires him first to stop the train at home signal. The inspector calls for enforcement of the rule; the company says that at busy junctions it would cause congestion; and the inspector ends the discussion by declaring that, at least in the case of a passenger train, the moving of a frog (or switch) should be prohibited. This general rule, which means that a distant and a home signal cannot be depended on to stop a train, has for many years been a prominent feature of the English signaling creed; and for an equal number of years has been ignored by individual railways, in many situations, on the plea that it was an unreasonable restriction. Logically, this difference of view, as between the Board of Trade inspectors and the men who have the responsibility of actual railway operation, can be settled only by early and general adoption of cab signals, or their equivalent; but whether or not the inspectors are prepared to take such a positive stand does not year appear.

The Cab Signal Propaganda in England

The annual meeting of the American Society for Testing Materials, held in Atlantic City, June 22-26, was successful both in the quality of the material presented and the number of members present. The work of the committee was painstaking in the extreme and their findings were accepted with little or no question by the society. There were two reports of committees on standard specifications and tests for cement and concrete that went through with little or no discussion, and it seemed as though the whole subject would be passed over in this way, but when the first paper, which was on the microstructure of concrete, was presented all such ideas were dissipated. The new method of examining concrete for the purpose of analyzing the reasons for failure was so simple in its procedure and seemed to appeal so strongly to the sense of what was fit that the meeting took on a tone of vigor that was quite unexpected. Then came three more individual papers, each dealing with a method of research that was important, which were discussed with interest and appreciation, the net result being a symposium along a single line of work that was valuable and suggestive. One of the most important papers, though there was no criticism or discussion on it, was that of C. D. Young, engineer of tests of the Pennsylvania Railroad, descriptive of the Altoona laboratory. This was printed in the *Railway Age Gazette* of July 2, 1915. In the first place, very few outsiders realize the extent of the activities of the test department of the Pennsylvania Railroad; then to those who are more or less familiar with its early, and one might almost say struggling, beginnings, its present magnitude, as indicated by this paper, comes as a startling contrast. The use of the proposed tentative specifications has worked out in a manner that is very gratifying. By this means the specifications are placed for one year in such a position that any necessary changes will be made before they are adopted as standard. This avoids the frequent disrupting of the standards.

American Society for Testing Materials

The last two decades have been marked by an ever-increasing demand on the part of the public for the elimination of crossings of railways with highways at grade. This movement has become especially active within the last five years, particularly in the smaller cities and the rural communities, where it is largely a result of the "good roads" agitation promoted chiefly by the owners of automobiles. In consequence, the railroads are constantly called upon to face new demands for work of this kind. Early efforts to secure elimination of grade crossings were characterized by unreasonable requirements, in some instances amounting to virtual confiscation, due largely to a lack of comprehension on

The Public and Grade Separation

the part of the public authorities of the true considerations involved and also to a certain extent to a limited point of view. Railroads usually receive the most consideration in cities where the municipal authorities and the public have a proper understanding of the principles involved, resulting from past experience. For this reason, the paper presented by C. N. Bainbridge before the Western Society of Engineers and abstracted in this issue, is of interest at this time as a clear, concise statement of the problem encountered. It draws attention to the necessity for careful independent consideration of each individual project. Each problem is just as surely one for independent and special solution as the location of a new railroad. It is not only necessary to consider the natural physical situation, but as well the arrangement of the improvements to which the community and the railroads have already been committed, largely as the result of the location originally selected for the railway. It is only in extraordinary cases that the slate may be washed clean to get a fresh start. It is also necessary to realize at the outset that there are several parties to the contract, each of whom is entitled to fair consideration and that the object to be attained is the elimination of the grade crossings in question at the least expense and with the minimum inconvenience to all. It is well to remember that the public eventually pays for these expenditures, though the immediate distribution of the expense usually is an equitable one, and that a city has no right to demand an extravagant, inefficient plan for track elevation or track depression, the cost of which will be borne by the public at large.

GOVERNMENT RAILWAY BUILDING IN CANADA

A WESTERN Canadian editor writes: "We want more railways. Optimism will never return to the west until the Dominion government builds some." To which the Montreal Gazette replies in an editorial: "It will be time enough to build new railways when they are needed." It adds:

"The three prairie provinces and British Columbia have incurred a gigantic indirect liability in guaranteeing railway bonds, while the Dominion government has just been obliged to take over the Transcontinental, which, including the Lake Superior branch, is 2,000 miles long and has cost well on to $200,000,000. It is likewise engaged in constructing the Hudson Bay Railway, which can pay for axle grease only by diverting traffic from the Transcontinental and other Canadian routes; and some of these days may have to furnish additional aid to the Canadian Northern or perhaps to assume the ownership and operation of that large system. Facts such as these impress the eastern man, but the western optimist is never so much at ease as when advocating the throwing of good money after bad, provided of course it is someone else's money."

Especially pertinent is the reference to the National Transcontinental, which the government "has been obliged" to take over, because it was built by a government commission through an unproductive territory on such an extravagant scale of expenditure that the government could not get a private company—the Grand Trunk Pacific—to operate it rent-free for seven years and thereafter pay for 43 years a rental of three per cent on a cost which a government investigating commission found to include a waste of $40,000,000. With these facts in mind the Montreal Gazette points out that just now it would be difficult for the government to borrow for new railways, even if it were disposed to do so, for the following reason:

"Our experience of them (government railways) has not been encouraging. The usual plea in their behalf, that a government can raise money on better terms than a company, may be true; but it is equally true that a company is less extravagant and far more business-like. The Transcontinental is a monument more lasting than brass to the wasteful and bungling methods of government construction; and we may be sure that no matter how careful Mr. Cochrane and Mr. Gutelius may be supervising its operations the results will scarcely equal those of private management."

As the government has often failed to earn operating expenses on the Intercolonial, to say nothing of interest on the investment, there is foundation for this prediction. With reference to government railway management in another part of the world the Montreal Gazette adds:

"In Australia the government roads are suffering from poor crops and the depression, but instead of practicing economy the ministers in charge have been forced to spend freely for useless extensions in order to provide work for the unemployed in other walks of life."

In recent years Canada has been building railways at a very rapid rate. It not only has practically three transcontinental lines, but shorter lines and feeders are numerous. Last year Canada built 1,978 miles of new railway, or more than the United States, and in 1913 railway construction in Canada was only 60 miles less than in the United States. But for some time not only the government railways but even the better-located and better-operated private railways have been suffering from a scarcity of traffic.

Perhaps the Montreal Gazette might appropriately have said: "It will be time enough for the Canadian government to build more railways when some of the railways already built are needed."

LET YOUR LIGHT SHINE

FOR a long time the Pennsylvania Railroad has made a practice of publishing leaflets containing information for employees and the public concerning the service of the railroad and its many activities in various directions. These are sent to newspapers and employees and placed on its trains where they may be available to the public. One of its latest bulletins is entitled "He Serves the Railroad Most Who Serves Its Patrons Best," and is devoted to a number of instances in the everyday routine of the railroad where individual employees have won commendation for themselves and for the company by acts of special courtesy, kindness or thoughtfulness toward patrons. In most cases these incidents were brought to the attention of the company by letters from patrons written without the knowledge of the employees concerned.

For example, one of the letters was written by a passenger who happened to observe the unusual kindness of a station master to a foreign woman traveling with three children, who was compelled to wait over night at his station before resuming her journey on a morning train. The station master, noticing that the woman appeared ill, found that she and the children were hungry and provided lunch for them and lodging for the night. Another letter was from a man who was taken ill while on a train and wished to call the attention of the company to the courtesy of the conductor and trainmen in looking after his welfare. Another told of the courtesy of a station agent who loaned money to buy a ticket to a man who had inadvertently left his purse at home. Several of the letters expressed appreciation for unusual efforts or promptness on the part of employees in tracing and returning lost articles. In one case a roll of bills containing $390 was dropped on a station platform by a passenger, found by a station porter and returned to the owner the following morning. Another story referred to the award of a Carnegie medal to a crossing watchman for heroism in rescuing a little girl who had run in front of a moving engine.

Giving publicity to incidents of this kind is of benefit in two ways. It not only shows the employees that the company appreciates courtesy on their part, but it is the best kind of advertising for the railroad. It shows the public that it is the intention of the railroad not only to furnish safe and prompt transportation but to go further and treat the passenger as a guest. The employees are made to realize that their efforts to give good service are not always unnoticed and the public is given an opportunity to recognize that an occasional lack of courtesy on the part of an employee does not represent the policy of the company.

The Pennsylvania's information bulletins of this kind represent an admirable method of obtaining publicity for and setting the example of good service, which has also been adopted to some extent by other roads. The New York, New Haven & Hartford has recently begun the issuance of a similar leaflet and many other roads accomplish the same result in various ways. As far as the employees are concerned the various employees' magazines afford an excellent medium for disseminating information regarding examples of special service or faithfulness, but the importance of bringing such matters to the attention of the public should not be overlooked.

A RIGHT OF THE STATES

A VERY notable discussion of regulation of commerce is the address by Alfred P. Thom entitled "A Right of the States," which was delivered at the recent meeting of the State Bar Association of Tennessee. An abstract of this address is published elsewhere in this issue. The principle of "state's rights" is often advanced as an argument against the increase of federal regulation of commerce. Mr. Thom by broad implication points out that this overlooks one of the most vitally important rights of the states—their right to be protected by the federal government from unfair and burdensome regulation of their commerce by one another.

He recalls the historic fact that the need for regulation by some central authority to stop legislation by the individual states which burdened the commerce of all was one of the main reasons for the creation of the federal government. The states, by their jealous, selfish and parochial measures, were mutually ruining each other; and it was to forever end this internecine warfare that the federal constitution was made to provide that Congress should have power "to regulate commerce with foreign nations and among the several states." It was recognized from the start that this was one of the most important provisions of the constitution, and that one of the most important rights of the states was to have Congress exercise the authority conferred by it. Therefore, to contend, as some do, that it is an invasion of the constitutional rights of the states for Congress to take appropriate action to protect them in the enjoyment of their express constitutional right to be free from measures adopted by individual states which burden the commerce of all is highly irrational.

Turning from the legal to the practical aspect of the matter, there never was, as Mr. Thom clearly shows, more need than now for the federal government to put into effect measures adapted to protect the states and the nation from action by individual states having the intention and result of burdening commerce in general. A very much larger proportion of the country's commerce is "among the states," and a very much smaller proportion of it intrastate, than was the case at the time of the adoption of the constitution. The tendency of the individual states, as strikingly illustrated by their regulation of railways, to strive to promote their apparent interests at the expense of the interests of the other states and of the nation as a whole is, however, as strong now as it was then. The result of this relatively enormous increase of commerce "among the states," without any diminution of the tendency of the individual states to try to secure unfair advantages over the other states, is that the right of each and all of the states to have their commerce move freely and be handled economically, efficiently and profitably, is being flagrantly violated to the injury and loss of the people of every state and of the nation.

The unfair and injurious regulation of commerce by the individual states, as applied to railways, takes multifarious forms. Texas first, and then other states following its example, have tried to so regulate state rates as to make them lower than the corresponding interstate rates and than the intrastate rates of other states, and as to secure a monopoly of their own markets for their own producers and jobbers. This practice has been condemned by the Interstate Commerce Commission and the Supreme Court of the United States in the Shreveport case, but is still widely persisted in. Many states have passed laws making requirements as to the construction, equipment and operation of railways which are much more drastic and expensive than those which have been imposed by their sister states or by the federal government. The effect of such regulation cannot be confined within the boundaries of the states imposing it. It increases the cost both of transportation in other states and of interstate transportation. In many cases it requires the railways, in rendering their services in other states and their interstate service, to do things which the other states and the federal government do not want them to do.

Numerous states have passed laws for the regulation of the issuance of securities by railway companies chartered by these particular states. There is hardly a railway in the country which does not operate in more than one state, and most of them operate in several states. In consequence, when one state regulates the issuance of securities it determines how and to what extent a railway company may finance its development in from one to 14 or 15 other states. Such regulation is not state regulation. It is the regulation of "commerce among the states," and if not in violation of the letter is certainly in violation of the spirit and intent of the constitutional provision giving Congress alone power to regulate commerce "among the states."

Not only do the states pass much regulatory legislation by which they harm each other and the nation, but in many cases where uniform action by them is needed it is impossible to secure it. For example, last winter and spring legislation was needed and sought in various New England states to permit the reorganization of the Boston & Maine system. Some of the states passed it and others refused to. There being no uniformity, either those that acted were wrong or those that refused to act were wrong.

Moreover, while state regulation very generally harasses and burdens the commerce of the several states and of the nation, it also often leaves loopholes through which railway companies may escape from needed control. There has been much denunciation of the financial mismanagement of the New York, New Haven & Hartford under the Mellen regime. But this could never have occurred but for the looseness of the laws of one state—Connecticut. The New Haven had one charter from Massachusetts and another from Connecticut. As the Massachusetts Public Service Commission said, in a report rendered by it last February, under the laws of Massachusetts railway companies "have been given no broad, unsupervised power to acquire even the stock of other railroad companies. The general policy of Massachusetts is expressed in an act which provides that a railroad corporation shall not without express authorization by the proper officials, directly or indirectly subscribe for, take or hold the stock or bonds of or guarantee the honds or dividends of any other corporation. "The policy of Connecticut," as the Massachusetts commission said, "has been very different. The New York, New Haven & Hartford Railroad Company, under Connecticut law, has for many years had unlimited power to acquire the stock or securities of any other corporation at any time and at any price and no matter what kind of a corporation it might be. . . . In respect to the issuing of stock and securities, the inconsistency between the laws of Massachusetts and Connecticut is equally marked. . . . The contrast between the provisions of the Connecticut and Massachusetts statutes in the foregoing and in other respects is very great. They cannot be harmonized nor reconciled. To sum the situation up briefly, and yet with reasonable accuracy, Massachusetts has tried to make the New Haven a supervised railroad corporation; Connecticut has made it largely a non-supervised holding company. For years the New Haven company disregarded the laws of this commonwealth and relied upon the broad powers and privileges granted by Connecticut."

Practically every transaction under the Mellen regime which has been condemned by public sentiment was carried through under the Connecticut laws which the Public Service Commission of Massachusetts denounces. So it has been with respect to the abuse of the holding company. Under the common law one corporation could not own stock in another corporation. The legislatures of New Jersey and several other states abrogated this common law principle and turned loose all kinds of holding companies to prey upon the people of the United States in order that the states creating them might profit by receiving fees for chartering them.

We might go on and fill column after column with other specific examples of the way in which the individual states, by foolish or vicious legislation, have denied to the several states and to the

nation the right to which Mr. Thom refers to have their commerce left free from injurious restrictions and burdens. Experience has demonstrated only too conclusively that this "right of the states" will never be properly and adequately safeguarded and upheld until the federal government fully asserts its paramount authority over interstate commerce. Such action is essential for the protection and furtherance of the rights of the people of the very states which resort to such foolish and harmful legislation.

The first step in this direction should be the passage of an act for the federal incorporation of all corporations doing an interstate business. The next should be the passage of a law either abolishing all state regulation of railways which affects interstate commerce, or making all state regulation of railways subject to review and control by the Interstate Commerce Commission. There is no more sense in the kind of state regulation of railways which we have now than there was in the sort of state regulation of commerce which contributed so largely to forcing upon the attention of the people originally the need for the adoption of the federal constitution.

THE L. C. L. FREIGHT PROBLEM

NO subject has received more attention from railway men during the last three or four years than the reduction of loss and damage claims. Any money paid out on this account is a direct economic waste, as it depletes the funds of the railway without adding to the property of the claimant. The largest single source of such claims is l. c. l. traffic. One road with annual gross freight earnings of over $75,000,000 finds that over 30 per cent of all payments for claims go for l. c. l. shipments in spite of the fact that this traffic forms considerably less than 10 per cent of the total business handled. These heavy losses arise primarily from rough handling of fragile materials and from errors in forwarding. In another column there is described a method to reduce losses from the latter cause employed at the Chicago freight house of the "Soo" for a year, which is both inexpensive and simple. This is only one of numerous methods which are being tried at various points. The test of the practicability of any of these plans s whether the claims are reduced by an amount sufficient to offset the increased expenditure.

While given a large amount of attention, the reduction of claims is only one phase of the l. c. l. problem. This class of traffic is very expensive to handle at best. Facilities must be provided in industrial centers where property values are high and where fixed charges are in proportion. It is therefore necessary to design and to operate these facilities to the best advantage in order to reduce the unit overhead cost to the minimum. The nature of the traffic also makes necessary a heavy expense for handling. To reduce the amount of labor necessary, motor trucks, elevators and other forms of mechanical appliances have been perfected and are being used while a number of methods are also being employed to increase the efficiency of the labor itself, such as the bonus system and piece-work.

The handling of l. c. l. freight has many ramifications, the study of any one of which may lead to important economies. To secure a full discussion of these various developments we have announced a contest on The Handling of L. C. L. Freight to include all phases of this problem from the time the freight is received at the freight house until it is delivered to the consignee at destination. We desire to secure general discussions of this subject with particular reference to improved designs and methods of operation. Data regarding such improvements should be given in detail. Prizes of $50 and $35 will be paid for the two best papers received, the award being based upon the completeness of the discussion and the practicability of the ideas presented. All other contributions accepted and published will be paid for at our regular space rates. All contributions should be sent to the Editor of the *Railway Age Gazette,* 608 South Dearborn street, Chicago, and must be received before August 1, to be considered by the judges.

Letters to the Editor

DEPRECIATION AND "CONFISCATION"

New York.

To the Editor of the Railway Age Gazette:

In his article on "A Billion Dollar Confiscation," Morrell Walker Gaines exhibits some confusion regarding the subject of depreciation reserves and retirement accounting which should be explained, especially since the points were not developed in your editorial comment.

The requirement that plant retired be credited to fixed capital and charged to a depreciation reserve is a book transaction, designed to keep the fixed capital accounts in conformity with actual fact. If the reserves are inadequate and a part of the charge must be divided between income and surplus, investors are not being mulcted in any way. In fact, their interests are being conserved by the required accounting. The depreciation reserve is created for the protection of the capital investment: income is charged to build up a reserve which will restore the capital that has been consumed in the plant retired. If it so happens that reserves for this purpose have not been created, the charge to income or surplus for any deficit is prima facie evidence of neglect in insuring the perpetuity of the capital investment and of effective, though perhaps rigorous, steps being taken to remedy past neglect.

Another advantage of the required accounting is that it provides for the replacement of original capital investment, not of items of plant. From which it follows that any increased costs of new plant are automatically capitalized, as they legitimately should be. Mr. Gaines also speaks of the hardship to the roads in requiring them to charge expense with the annual depreciation quota at the same time they are bearing the deficit of their reserves in income. Undoubtedly this charge to expense will diminish distributable earnings, but the investors are benefited and the credit of the road improved by the process.

In the first place the creation of a depreciation reserve by charging expense results in a diversion of income from surplus to the reserve. The road loses nothing by the transaction, but really gains from an investing point of view. This is seen to be true when it is recalled that a depreciation reserve is pledged to the protection of the capital investment, with consequent greater security to stockholders and increased stability to bondholders. The practice of issuing long term bonds on the security of the stock investment in plant, whereby the term of the bonds exceeds the life in service of the plant, requires depreciation reserves to insure the replacement of the bondholders' equity. Therefore, if reserves are created, the bondholders are protected and they will accept lower interest rates in consequence.

The stockholders also have their proprietor shares enhanced, since the depreciation reserves are invested in the plant and are unalienable, while surplus may be invested in outside securities of doubtful value and subject to market fluctuations.

From the point of view of sound accounting, depreciation reserves are absolutely necessary in a continuing public utility. And they are based on good economic theory. Both the public and the investors are protected by the reserves and the carrier's best interests as a public utility are conserved. If testimony were needed in support of these assertions, the practice of telephone, telegraph, light and power, water companies and others would be sufficient. It should also be recalled that recognition of depreciation charges in the expense accounts for the replacement of capital places the roads in a much better position in rate cases, since it removes one more point of dispute regarding the legitimate requirements of the road for revenue.

Lawrence K. Frank.

A Study of Grade Crossing Elimination in Cities*

A Discussion of the More Important Elements Which Must Be Considered in the Solution of This Problem

By C. N. Bainbridge
Office Engineer, Chicago, Milwaukee & St. Paul, Chicago

The question of the separation of grade crossings in municipalities is vital and its importance cannot be denied. No single question affecting the relations of railroads to cities has received more consideration during the last decade. Various cities, utilities commissions and legislatures are requiring the railways to separate the grades of their tracks from those of the streets, and in practically all instances where such orders are issued, they specifically designate the manner in which the separation of grades shall be made.

The railroads recognize the right of a city to interfere with the grade of the railway tracks only as is imposed by its duty to preserve, as far as possible, the safety of public travel upon and along the streets and avenues intersected by such tracks, but do not concede that a city has authority to determine whether grade separation should be accomplished by elevation or depression of the tracks. The railways claim that they, and not the city, are entitled to the choice between two methods that are equally safe.

Numerous articles have been published covering track elevation. Little, however, has been written concerning the depression of tracks partially or completely and carrying the streets over the tracks on bridges or viaducts. It can not be said conclusively which method is the more satisfactory. Although track depression has found favor in several cities, few projects of this nature have been carried to completion, and it remains for time to determine whether track depression will be as satisfactory as track elevation is.

It is the purpose of the writer to set forth some of the general features which must be considered by the engineer, in studying a problem of grade crossing elimination. Probably the biggest factor is the cost, this being the most vital to the railroads, who generally bear the greater burden of the expense. The geological character and topography of the country and the effect on the grade of the railroad are also big factors in selecting a plan. In a flat low district like that around Chicago, there is little choice. Track depression would be out of the question on account of difficulties due to water and interference with the sewer system. This leaves the alternative of elevation, or partial elevation. Chicago, however, is only one city in many where grade separation is being carried on, and at other places where the tracks are at the summits of ascending grades, the natural selection would be depression, unless this proved to be too expensive. There are still other places where the ground is high above water and the present tracks nearly level, where either track elevation or track depression could be adopted without excessive gradients.

Numerous elements are involved in the study of a project of this nature and for convenience they will be considered in the following order: Excavation or embankment; clearances; bridges; right of way and retaining walls; changes in streets; apportioning of expenses; advantages and disadvantages, and conclusions.

EXCAVATION OR FILL

To carry the tracks over the streets requires a vertical separation of grades of from 15 ft. 6 in. to 17 ft. 6 in., allowing from 3 ft. 6 in. to 4 ft. for floor depth and 12 ft. to 13 ft. 6 in. for headroom. To carry the streets over the tracks requires a vertical separation of grades of from 21 ft. 6 in. to 26 ft. 6 in., allowing from 18 to 22 ft. for clearance and from 3 ft. 6 in. to 4 ft. 6 in. for floor depth. The difference of from 5 to 11 ft. in the amount of vertical separation of grade, required for complete elevation and complete depression, together with the increased width of roadbed required for track depression over that required for track elevation, in order to provide for drainage, makes the amount of excavation, in the case of track depression considerably more than the amount of fill required for track elevation. This is illustrated by the accompanying figure.

Other things being equal, material can be excavated as cheaply in a cut for track depression as in the borrow pit for track elevation; but usually the cost of dumping material for fill will exceed the cost of wasting material from the cut, due to the fact that material for fill is usually dumped from a trestle, and the cost of the trestle is chargeable to the fill. The additional cost of a trestle will go a long way toward balancing the cost of additional yardage required in the project of track depression.

It is sometimes the case that a project of grade crossing elimination is carried on to advantage in conjunction with some other project, such as the construction of freight yards, where considerable grading is necessary and material may be borrowed or wasted to good advantage and at small expense. Other items,

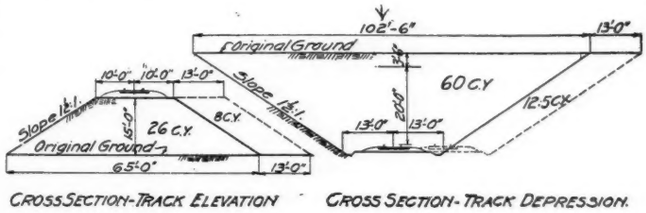


Fig. 1—Typical Sections for Track Elevation and Depression

such as the difference in the cost of bridges and walls, the number of tracks, and the cost of maintaining traffic, changes to sewers, the nature of the material to be excavated, the depth of depression and the amount of elevation may throw the balance either one way or another.

CLEARANCES

In recent years numerous state legislatures have passed various laws regarding vertical and side clearances.† In some cases the requirements of these laws are more rigid than the present standards. In most cases, however, there is a provision in such laws which allows this clearance to be reduced in special cases, if approved by the city or railroad commission. For track depression projects the overhead clearance generally adopted is between 18 ft. and 22 ft., but in some instances where passenger traffic alone is handled on the lines this is reduced to 16 ft., although this latter figure is somewhat scant if electrification is contemplated at some future date.

Where the tracks are elevated, the clearances of the bridges over the streets varies in different localities, the usual clearances being 12 ft. to 13 ft. for streets without street cars, and 13 ft. 6 in. to 14 ft. 6 in. for those with street cars. For proposed work there is little variation from the above clearances for bridges over streets, but there is a strong tendency, as indicated by recent legislation, to specify clearances under bridges over the

*Abstracted from a paper presented before the Western Society of Engineers, Chicago, June 24, 1915.

†For a discussion of clearance legislation see *Railway Age Gazette*, August 28, 1914.

tracks of 21 or 22 ft. wherever possible, although much smaller clearances have been used in the past.

BRIDGES‡

Bridges for track elevation or track depression projects are in practically all instances of a permanent nature and are constructed either of structural steel or reinforced concrete; or a combination of both. A few of the roads are adopting concrete, wherever possible, to the exclusion of steel in structures of this class, as the first cost is the same or less than steel, the maintenance is less, and it can be treated aesthetically to better advantage where such treatment is warranted.

Bridges for track elevation can be divided into four types:

Type A. Structures spanning the full width of the street with single spans.
Type B. Structures spanning the full width of the street with two spans, supports being placed in the center of the street.
Type C. Structures spanning the full width of the street with three spans, supports being placed at the curb lines.
Type D. Structures spanning the full width of the street with four spans, supports being placed at the curb lines and at the center of roadway.

In practically all types it is desirable to: Keep the floor of the bridge as thin as possible; to avoid any projections above the top of rail, which might be a menace to safety, and to select a type of bridge which can be altered readily to provide for additional tracks.

Except in cases of narrow streets where comparatively short spans can be employed, bridges of types A. B and C have no alternative, except the use of steel girders, although they have been used to some extent by resorting to a combination of structural steel and reinforced concrete, but not to the exclusion of the deep side girders. These types, however, have the first qualification of thin floors, but cannot in all cases meet the second qualification of no projections above the top of rail, nor do they meet the third provision for taking care of additional tracks without considerable alteration and expense.

Bridges of types B and D have the objection that the roadway is obstructed by the supports in the center of the street, but, with the possible exception of structures spanning boulevards, there is no serious disadvantage in this, provided the roadway on each side of the center supports is of sufficient width to allow one vehicle to pass another going in the same direction. This objection would be even less for structures spanning streets with double street car tracks, although it requires the spreading of the car tracks. The car tracks themselves form a natural barrier in the center of the street, there being little occasion for traffic from one car track to the other, especially in the short distance occupied by the bridges.

Bridges of type D meet the three requirements of thin floors; no projections above the top of the rail and ease of alteration to provide for additional tracks. Due to the comparatively short spans, this type is well adapted to be constructed either of steel or concrete.

It has been recognized by practically all parties interested that tight floors are a necessity in bridges crossing city streets, not only to prevent grease, dirt and water from dropping through, but also to deaden the noise of trains passing at high speed across the bridges. There are numerous types which might be adopted, the various roads using the one with which they have had the greatest success, but in all probability floors as used in concrete bridges of type D will remain the cheapest.

Bridges for track depression projects may be divided in two main types:

Type E. Bridges spanning the tracks with clear spans.
Type F. Bridges spanning the tracks with two or more spans with intermediate supports.

In bridges for track depression it is also desirable to keep the floor of the bridges as thin as possible; avoid any obstructions between tracks, and to select a type of bridge which can be altered readily to provide for additional tracks.

Bridges of type E meet the first of these requirements, but in most cases not as well as structures of type F. For streets with narrow roadways and short spans, not exceeding three tracks, the deck type structure of either concrete or steel can be adopted. For longer spans and wide roadways, however, the deck type must give way to the through type with girders projecting above the roadway, and reinforced concrete cannot be used to advantage; but a combination of structural steel and concrete may be used. For narrow roadways but two lines of girders need project above the roadway, one on either side at the curbs; but for wide roadways center girders are required. Structures of type E do not lend themselves well to the third requirement, that of additional tracks. Either additional tracks must be provided for when the structure is built, or considerable expense must be incurred to lengthen the bridge to provide for them later.

Bridges of type F meet the first requirement of thin floors and the third requirement of providing for additional tracks, but do not meet the second requirement of no obstructions between tracks. They are well adapted to the use of concrete.

RIGHT OF WAY AND RETAINING WALLS

In general, for the same number of tracks in each case, track depression will require a greater width of right of way than track elevation, even where the tracks occupy the full width of right of way and where retaining walls are resorted to. It has been shown that the amount of additional right of way required for track depression over that required for track elevation, if no retaining walls are used, depends on the amount of elevation and depression of the tracks.

In cases where the entire right of way is occupied by tracks retaining walls would be required for both track elevation and

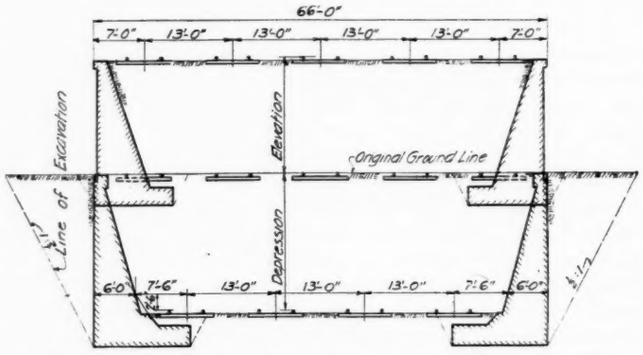


Fig. 2—Relative Track Capacities for Track Elevation and Depression

track depression. In such cases it is seen from the figure that it is necessary to acquire additional right of way to accommodate the same number of tracks in depression as in elevation, or else eliminate one track to allow room for the retaining walls, which must be built on railroad property. The loss due to the elimination of one track to the railroad company is impossible to determine. An order of any city or commission calling for track depression under such circumstances, in the face of the railroad's opposition, amounts to confiscation of railroad property without compensation and without due process of law, and it is doubtful if it would be upheld in the courts.

Both of these conditions are serious handicaps for track depression, for in the majority of cases the districts where grade separation is required are such as to make the acquisition of additional right of way almost out of the question on account of the value of adjacent property, so that the building of retaining walls is the only alternative.

There may, however, be instances where the tracks run through a strictly residence district, where land values would not be excessive, but this condition is the exception rather than the rule.

Any one of numerous types of retaining walls may be adopted on any project, economy being the prime factor in the selection. Much literature has been published regarding the economy of

‡For an article on track elevation subways see *Railway Age Gazette*, March 6, 1914, page 459.

various types of walls, and this phase of the subject will not be discussed further than to state that for walls of the height required for track elevation and track depression a gravity wall will, under ordinary conditions, be cheaper than the reinforced concrete types

CHANGE IN GRADE OF STREETS

So far only complete elevation and complete depression of the tracks have been considered, which require very little change in the grades of the streets. The question immediately arises as to whether or not a partial elevation of the tracks with a partial depression of the street, or a partial depression of the tracks with a partial elevation of the streets, would not be the plan to adopt. It might be said here that on practically all projects for complete track elevation or depression the plans usually provide for at least a slight change in grade of the street, varying from 1 ft. to 3 ft., which change can readily be made without incurring excessive expense or property damage. It may also be said that to change the grade of the street entirely without changing the railroad track is unusual, except in the case of isolated crossings or in country districts.

To change the street grade any appreciable amount brings up questions of allowable grades on streets, economy, drainage and interference with sewers, gas and water mains, and property damages. Chicago has fixed by ordinance a maximum grade of 3 per cent. To adopt this grade, however, in all cities would be unquestionably in error, especially so in a hilly city, where existing street grades of from 6 to 8 per cent are not uncommon.

Although most cities try to limit the allowable grades to 3 per cent or 4 per cent, the following table gives some of the grades which have been used on work of this nature in various cities:

Location	Maximum Grade
Chicago	3½ per cent, usual 3 per cent
Buffalo	4 per cent
Joliet, Ill.	3½ per cent
Evanston	3½ per cent or 3 per cent
Milwaukee	4 per cent
Minneapolis	5 per cent, 4 per cent, usual 3 per cent
Cleveland	6 per cent, usual 4 per cent
Detroit	4 per cent, usual 3 per cent
Philadelphia	5½ per cent, usual 3 per cent
Indianapolis	4½ per cent, usual 3 per cent
Washington	9 per cent, 8 per cent, 6 per cent, usual 3 per cent, 4 per cent
Newton, Mass.	9 per cent, 8½ per cent, 7½ per cent, 6 per cent, usual 3 per cent and 5 per cent
Lynn, Mass.	3 per cent, 4 per cent, and 5 per cent
Brockton	9 per cent, 5 per cent

Where the street is to be carried over the tracks, the sidewalk and roadway must be elevated the same amount, but where the street is carried under the tracks the roadway is sometimes depressed 4 or 5 ft. further than the sidewalk at the deepest part. This has the disadvantage of high curbs, but where wagons would back up to property adjacent to right of way for loading or unloading it would be an advantage. It also has the additional advantage of producing a smaller actual damage to property, as very often the sidewalks can be left at the original level, though the streets may be depressed 4 or 5 ft.

At first glance it would be natural to say in most projects that the less the grade of the tracks is changed the less the project will cost. Streets, however, may occur with such frequency that the cost of excavating or filling streets, the cost of repaving streets and sidewalks, alterations to sewers and water pipes, and property damaged, will be equal to or greater than the cost of excavation or embankment for track elevation or depression.

Wherever streets are depressed adequate provision should be made for drainage. Catch basins with proper connections to sewers should be placed some distance outside the portals of the bridge so that in winter or spring time, when the thaw starts, they will not be in the shadow of the bridge and remain frozen. Similar provision and precaution to provide for drainage should be exercised in the cut in the case of track depression.

In cases where the streets or tracks are depressed to such an extent as to interfere with sewers, the problem is much more complicated. Either new sewers must be constructed at a lower level or else the sewage will have to be siphoned. Both of these schemes entail considerable expense and are serious handicaps to track depression.

Interference with the water and gas mains is a less serious objection, the question of gradients there being a secondary consideration. Although it adds quite an item to construction cost, provision can be made to carry them across the bridge floor, or depress them under the cut.

The question of property damage is one for which it is impossible to lay down any set rule. In making allowance for this phase of the question, each problem will have to be handled separately, the damages estimated and an amount allowed which would be sufficient to put the property back into as good a condition or perhaps better condition than previously existed. It will be found, in many cases where damages are settled out of court, that considerable saving can be effected by buying the property damaged and selling it again after the work is completed.

APPORTIONMENT OF EXPENSE

The question of apportioning the expense incident to the separation of grades is of great importance, and with the exception of a few states, where legislation divides the expense on a percentage basis, the question is far from settled. There are a few cities where the railroads are required to pay the entire cost of grade separation. The unfairness of such order, however, needs little comment. There have been cases also where the expense has been borne by the municipality, the steam railroad, the street railway, and the various other public utilities, each doing the work and bearing the expense incurred by the changes to the property which it controls. Where this plan is followed there is controversy between the parties interested relative to procedure of the work, etc. It has in consequence not proved entirely satisfactory and is giving way to the more reasonable and logical method of considering the work as a unit and dividing the total cost of the project among the parties interested on a percentage basis agreed upon by the interested parties before work is started.

An examination of the different state laws and city ordinances enforcing grade separation shows that the apportionment of cost on a percentage basis has been followed in the majority of cases.§

ADVANTAGES AND DISADVANTAGES

Some of the benefits or advantages and disadvantages applying especially to either track elevation or track depression may be summarized as follows:

1. For track elevation, the work of construction can be carried on with little or no interference to traffic, either in the streets or on the railroad. It is, however, exceedingly difficult to depress the tracks without stopping traffic on both streets and railroads, or building a detour around the entire project. The question of time on construction is also an important factor. A track elevation project can be completed in considerably less time than it would take to depress the same number of tracks, because it is possible to carry on the work at many different points simultaneously.

2. A distinct advantage of track elevation is the ease with which the industrial situation can be handled. Industries having side track facilities can adapt themselves to take trackage from the elevated level by slight alterations to their buildings and doing their receiving and shipping from the second floor. For coal yards, trestles can be readily provided and are particularly advantageous. Also during construction elevation has the advantage that shipping facilities are disturbed very little, causing practically no interruption to business. Where tracks are depressed, there is usually not sufficient distance between bridges, nor between right of way lines to allow inclined tracks to bring the cars from the depressed tracks to the former ground level to serve the industries, and it is therefore necessary for the in-

§For an account of grade separation laws and requirements see *Railway Age Gazette*, December 12, 1913, page 1118.

dustries to adjust themselves to take trackage from the lowered track level by altering buildings. Even if there were sufficient distance between bridges to allow inclined tracks, such an arrangement is objectionable, as it requires the right of way to be encumbered with massive walls which tend to restrict the development of the right of way and the industries. Much inconvenience and interruption to business must be contended with, while the tracks are being lowered and changes to buildings are being made.

The expense for making such changes, either in the case of elevation or depression, represents a considerable sum. The industries have claimed that the railways should bear the expense of changes to industries and industry tracks made necessary by the change in grade of the railway company's tracks. The railway companies do not concur in this and the practice has been for the industries to bear the expense, as the railway companies contend that the grade of the tracks are changed not on their initiative, or for their benefit, but by orders of the cities, or utilities commissions.

3. The annoyance from noise, smoke and gases will be less from track elevation than track depression. Little need be said to convince all that the smoke and gas nuisance will be less to those on the streets from tracks on a high level than from tracks on the lower level. The question of noise, however, is one on which there can be some difference of opinion.

From the foregoing considerations it may be said in a general way that track elevation is more satisfactory than track depression, both to the railroads and to the industries, and at the same time possesses many advantages to the city. With the possible exception of cases where the tracks pass through a high class residence district where the aesthetic is of such importance as to outweigh the other factors, track elevation would appear to be the best solution of the problem.

ACCIDENT CAUSED BY DEFECTIVE WHEELS

H. W. Belnap, chief of the division of safety of the Interstate Commerce Commission, has made a report on the Chicago, Milwaukee & St. Paul derailment which took place at Oakwood, Wis., on February 9, 1915, an abstract of which follows:

The accident to the freight train resulted in the derailment of 29 cars, 11 of which, together with the station building, were destroyed by fire. The train involved in the accident was a westbound freight train consisting of 75 cars and a caboose, and was derailed at the frog of the house-track switch near the station at Oakwood, while moving at a speed estimated to have been about 25 miles an hour.

Examination of the track showed that the first indication of anything wrong was at a point about one mile east of Oakwood, where an oil box, brass, packing waste, etc., were found on the east side of the track. About 370 ft. west of this point the rear truck under Missouri, Kansas & Texas box car 60628, the tenth car in the train, left the rails and ran along on the ties until the frog at the house track was reached, where the other 28 cars were derailed. The oil box, etc., were found to have come from the rear truck of the box car, the partial destruction of the truck at this point evidently having been due to the defective condition of the wheels under the truck. Three of the four wheels were defective, the left forward wheel being the only one intact. The others had flat spots, broken flanges, etc.

Investigation developed that this car was received from the Belt Railway at Chicago in a transfer train at 5:35 p. m. on February 8. Before the train was broken up and switched around all the cars in the train were inspected and, although wheel defects were found in other cars, none was found under car 60628. Although this car was again inspected by two car inspectors, one safety-appliance man, and two oilers before being sent out, no defects were discovered.

Engineman Christoph stated that as his train was approaching Oakwood he looked back and noticed fire flying from under the train, and at once made an application of the air brakes, at about which time the derailment occurred. Previous to this he did not notice anything wrong. At Wadsworth, a station 30 miles east of Oakwood, the train was inspected by the brakemen, but nothing wrong was discovered at that time.

This accident was caused by the defective condition of wheels in the rear truck of M. K. & T. box car 60628. This defective condition resulted in the partial destruction of the truck and its subsequent derailment.

The examination to determine the reason for the failure of the wheels under the car was conducted by James E. Howard, engineer physicist, tests being made in conjunction with representatives of the Chicago, Milwaukee & St. Paul at the shops of that company in Milwaukee, Wis.

SUMMARY

The examination of the wheels in the truck which was under M. K. & T. box car 60628 clearly fixed the immediate responsibility for this derailment on the worn treads of two of the wheels. These flat spots were not "slid flat" places, but were grooves 11 in. long each, worn in the treads, and having depths of three-eighths and five-sixteenths of an inch, respectively. The grooves were wider than the head of a 100-lb. rail. The axles drifted to the right, in the direction of these wheels, which showed worn flanges, approaching vertical faces.

The examination also revealed the fact that these wheels had less depth of chill than customary in wheels of this type, and at the worn spots the chilled metal was entirely absent.

The lack of rotundity of the wheels was such that excessive wabbling of the journals occurred at every rotation, bringing undue strains on the truck frame. At usual speeds these oscillations took place several times a second, and they are believed to have been the cause of the injury to the truck and the immediate forerunner of the derailment.

Furthermore, the mated wheels were of different sizes. Those on the right-hand ends of the axles were three and four "tape sizes" smaller, respectively, than the left-hand wheels. These differences would tend to cause the truck to run in an oblique position, not square with the track, and also be the equivalent of a certain amount of braking power set against the train.

A conspicuous feature associated with conditions of these wheels is the fact that the inspections which had been made from time to time failed to detect the presence of the flat spots. These defects in the treads were undoubtedly of long standing, and the car must have passed quite a number of inspections since the wheels had become unserviceable. These defects were of such a nature that they should have been discovered by ordinary inspection.

In a previous report covering the investigation of a derailment of a passenger train, due to a broken wheel, attention was called to the alarming frequency of accidents due to broken wheels, and statistics covering a five-year period were published, showing that during that period the derailments attributable to defective wheels were approximately 31 per cent of the total number of derailments charged to defective equipment. In the commission's Accident Bulletin No. 52 there is published a summary of derailments due to defects of equipment on steam railways for 13 years ending June 30, 1914. This summary shows that of 37,456 derailments due to equipment defects 12,882, or more than 34 per cent of the whole, were caused by defective wheels. The property loss suffered by the railroads on account of these 37,456 derailments was $30,138,241, of which sum $12,506,766, or about 41.5 per cent of the whole, was attributed to derailments caused by defective wheels.

These figures indicate that defective wheels constitute one of the most prominent causes of derailments. In the interest of safety, as well as of economy, steps should be taken by the railroads to insure that sound wheels will be obtained from the manufacturers in the first instance; and methods of inspection should be adopted to prevent the placing in service of defective wheels and insure that wheels which have become defective through service shall be removed in ample time to provide for the safe operation of trains.

"A Right of the States" Which is Often Overlooked*

Constitutional Duty of Federal Government to Protect From Harmful Regulation of Commerce by Sister States

By Alfred P. Thom,
General Counsel of the Southern Railway

One hundred and twenty-six years ago the United States became a nation. On the 4th of March, 1789, they joined in putting into effect the Constitution which formed them into "a more perfect union" and organized them to take their place as a unit among the nations of the earth.

Only recently they had been separate and distinct colonies of Great Britain, legally foreign to each other, and were bound together by no ties except a sense, common to them all, of oppression and discontent and a common aspiration and purpose of liberty. They combined to declare and to fight for their independence, and to assert that, as free and individual states, they had "full power to levy war, conclude peace, contract alliances, establish commerce, and to do all other acts and things which independent states may of right do."

During the succeeding epoch-making struggle, they sought to bind themselves together by something more enduring than the sympathies and exigencies of the existing war, and, to this end, adopted as their bond of union the Articles of Confederation.

The Articles of Confederation were soon found to be utterly inadequate to a national existence. A government without a purse, and hence without power to provide for the common defense, or to insure domestic tranquillity, was a mere "rope of sand" and could not long endure.

But there was another cause for dissatisfaction, which was hardly of less importance than a provision for the common defense and for the preservation of the national existence. The needs of trade were becoming more and more apparent and its just regulation the subject of greater and more universal public concern.

When the war ended and independence was an accomplished fact, each state possessed a sovereignty which was practically unlimited over its foreign commerce and over its commerce with the other states. Between many of them there was a race of greed and selfishness for commercial advantage and supremacy.

It will be noted that each state possessed the power of imposing export taxes and could thus keep its products at home, excluding them from the use and enjoyment of the people of the other states; that each state possessed the power of imposing import duties and thus could exclude people of the other states from its markets; and that each state retained complete control over its own ports, and thus, by its commercial policy, could, through the competition of ports, regulate or break down the commercial policy of another state in regard to its own ports and in regard to its own commerce.

EARLY ABUSES OF REGULATION

Nor were these powers merely theoretical. They were brought into active and oppressive operation. They were made the means of commercial war by one state upon another.

For example:

Virginia, by her export duties and inspection laws, with the incidental tax, sought to keep her tobacco at home.

Maryland, by her inspection laws and taxes, sought to do the same with regard to her potash and pearlash.

Massachusetts prohibited the exportation of grain or unmanufactured calfskins and imposed an onerous inspection tax on exports to other states of tobacco, butter, and other products, while North Carolina laid, for a limited time an embargo on the exportation to other states of corn, wheat flour, beef, bacon, and other necessaries of life.

Turning to imports:

New York, by imposing an import duty, sought to exclude from its markets the butter, milk, and other dairy products of New Jersey and the firewood of Connecticut.

Rhode Island imposed an ad valorem tax of five per cent on all articles imported into that state from the other states as well as from foreign countries, with a proviso for reciprocal relief. And so with other states.

In regard to the commercial rivalry and war of ports, it was customary for states having available ports to impose an unlimited tax on all goods reaching this continent through their ports, and thus subjecting, for the benefit of themselves, the people of the other states to a substantial burden of taxation.

For example, the ports of Boston and New York were at one time far behind Newport in the value of their imports, and Rhode Island, according to the Supreme Court of the United States, paid all the expenses of her government by duties on goods landed at her principal ports.

The condition at that time of commercial selfishness and greed between the states is thus described by Fiske in his work on the "Critical Period of American History, 1783-1789," at page 144:

"Meanwhile, the different states, with their different tariff and tonnage acts, began to make commercial war upon one another. No sooner had the other three New England states virtually closed their ports to British shipping than Connecticut threw hers wide open, an act which she followed by laying duties upon imports from Massachusetts.

"Pennsylvania discriminated against Delaware; and New Jersey, pillaged at once by both her greater neighbors, was compared to a cask tapped at both ends. The conduct of New York became especially selfish and blameworthy. . . . The feeling of local patriotism waxed strong, and in no one was it more completely manifested than in George Clinton, the revolutionary general, whom the people elected governor for nine successive terms. . . . It was his first article of faith that New York must be the greatest state in the union. But his conceptions of statesmanship were extremely narrow. In his mind, the welfare of New York meant the pulling down and thrusting aside of all her neighbors and rivals. . . . Under his guidance, the history of New York, during the five years following the peace of 1783, was a shameful story of greedy monopoly and sectional hate. Of all the thirteen states none behaved worse except Rhode Island.

"A single instance, which occurred early in 1787, may serve as an illustration. The city of New York, with its population of thirty thousand souls, had long been supplied with firewood from Connecticut, and with butter and cheese, chickens and garden vegetables from the thrifty farms of New Jersey. This trade, it was observed, carried thousands of dollars out of the city and into the pockets of detested Yankees and despised Jerseymen. It was ruinous to domestic industry, said the men of New York. It must be stopped by those effective remedies of the Sangrado school of economic doctors, a navigation act and a protective tariff.

"Acts were accordingly passed obliging every Yankee sloop which came down through Hell Gate, and every Jersey market boat which was rowed across from Paulus Hook to Cortlandt street, to pay entrance fees and obtain clearances at the custom house, just as was done by ships from London or Hamburg; and not a cart-load of Connecticut firewood could be delivered at the back door of a country house in Beekman street until it should have paid a heavy duty. Great and just was the wrath of the farmers and lumbermen. The New Jersey legislature made up its mind to retaliate. . . . Connecticut was equally prompt. At a great meeting of business men, held at New London, it was unanimously agreed to suspend all commercial intercourse with New York. Every merchant signed an agreement, under penalty of two hundred and fifty dollars for the first offense, not to send any goods whatever into the hated state for a period of twelve months. By such retaliatory measures, it was hoped that New York might be compelled to rescind her odious enactment. But such meetings and such resolves bore an ominous likeness to the meetings and resolves which in the years before 1775 had heralded a state of war; and but for the good work done by the Federal convention another five years would scarcely have elapsed before shots would have been fired and seeds of perennial hatred sown on the shores that looked toward Manhattan Island."

But these discriminations and exactions of one state as against

*Abstract of an address delivered before the State Bar Association of Tennessee at Chattanooga on June 25.

the trade of another, this fierce commercial rivalry, this internecine warfare which threatened the commercial destruction of some states and the undue elevation, prosperity and dominance of others, were not the only reasons for the insistent demand, which preceded and finally controlled the Constitutional Convention of 1787, in regard to the establishment of a system of just and equitable regulation of commerce between the states by an authority fairly representing them all.

The question of commercial regulation, in addition to its commercial relation to the trade between the existing states, possessed also a most important and commanding political aspect. The development of the great west was then going on and had been stimulated by the emigration thither from the older states incident to the readjustments after the war, and the settlement of the whole western region was proceeding with great rapidity. The west was spoken of by George Washington as a "rising world," and signified particularly, in the minds of the statesmen of that day, the territory now constituting the states of Tennessee and Kentucky and the states afterwards carved out of the territory northwest of the Ohio and east of the Mississippi rivers. The question of the future political affiliations of this large and important territory was a question of prime and of vast importance to the then existing states.

Great Britain or Spain, close neighbors on the north and south, could easily outbid such a policy of narrowness and greed as the people of the west saw already in operation in many of the most important eastern states, and it was apparent that, whether or not such a policy should be adopted, could not be safely left to the individual states.

George Washington, in speaking of the future political affiliations of these pioneer western people, said:

"If we cannot bind these people to us by interest, and it is not otherwise to be effected but by a commercial knot, we shall be no more to them after a while than Great Britain or Spain, and they may be as closely linked with one of those powers as we wish them to be with us, and, in that event, they may be a severe thorn in our side."

It thus became politically, as well as economically, necessary to find a way of fairly regulating commerce in the interest of all, free from the narrowness, the greed and the selfishness of particular states.

FEDERAL GOVERNMENT ESTABLISHED LARGELY TO STOP SUCH ABUSES

The only way of remedying these commercial evils, which were flagrant and were universally recognized, and of meeting the political exigencies of the situation, was, according the the practically universal belief of the day, to exclude the states from the power to regulate commerce among the states and with foreign nations, and to confer that power upon a central authority which should fairly and equitably represent them all.

The public consciousness on this subject was, prior to the convention, indicated in a great variety of ways and from a great variety of sources.

Alexander Hamilton declared for a central government with "complete sovereignty over all that relates to war, peace, trade, and finance."

James Monroe, as chairman of a committee of Congress, in 1785 submitted a report declaring that:

"The United States in Congress assembled shall have the sole and exclusive right and power of determining on peace and war, except in the cases mentioned in the sixth article, . . . and of regulating the trade of the states, as well with foreign nations as with each other." . . .

James Madison moved in the General Assembly of Virginia a resolution for a convention of delegates of all the states "to take into consideration the trade of the United States; to examine the relative situation and trade of the said states; to consider how far a uniform system in their commercial regulations be necessary to their common interest and permanent harmony," etc.

There were similar expressions of view in the legislatures of Rhode Island, of Connecticut, of New Jersey, in resolutions of town meetings and in reports of committees of Congress.

The Madison resolution resulted in the assembling of the Annapolis Convention in 1786 and in a recommendation, by the delegates there assembled to consider the regulation of commerce, that Congress should call a general convention of all the states to meet in Philadelphia on the second Monday in May, 1787, "to devise such further provisions as shall appear to be necessary to render the constitution of the federal government adequate to the exigencies of the union."

This was the convention which framed the Constitution, and the declaration of the Supreme Court of the United States in the case of Cook vs. Pennsylvania, 97 United States, 574, is amply justified, to the effect that:

"A careful reader of the history of the times which immediately preceded the assembling of the convention which framed the American constitution cannot fail to discover that the need of some equitable and just regulation of commerce was among the most influential causes which led to its meeting."

The result of its deliberations on the four large subjects of national concern enumerated by Alexander Hamilton—which are the four fundamental essentials of national existence and efficiency—and as to which Hamilton declared that the federal government should possess complete sovereignty, namely, the purse, war, peace, and commerce, is exhibited in the following clauses of the Constitution:

"The Congress shall have power:

"To lay and collect taxes, duties, imports and excises, to pay debts and provide for the common defense and general welfare. . . .

"To borrow money on the credit of the United States.

"To regulate commerce with foreign nations and among the several states, and with the Indian tribes.

"To declare war. . . .

"To raise and support armies.

"To provide and maintain a navy."

The fullness, the competency and the completeness of no one of these powers has ever been questioned, except of the power to regulate commerce. It is universally recognized that it is a right of each state that the federal government shall provide for the common defense; that the federal government shall determine as between peace and war; that it shall raise and support armies and shall equip and maintain a navy.

But there are other rights of the states not less important and not less sacred. These include the right to avail themselves, separately and individually, of the protection guaranteed to them and to their people by the Federal Constitution against the selfishness in trade of their sister states.

In adopting the commerce clause of the Constitution they intended to secure protection against this very thing. In the light of the history of its adoption, is it not, since the Constitution, a right of New Jersey that New York shall not regulate the trade between them as it did when it excluded the products of New Jersey industry from the New York markets; is it not a right of the state of Connecticut, since the Constitution, that its products shall not be excluded from the markets of New York and Boston by state action, and is it not since the Constitution, a right of each of the states that Virginia and North Carolina and Tennessee and the great food-producing states of the west shall not be able, as Virginia and North Carolina once did, to put an embargo upon the shipments of their products beyond their respective borders, and shall not be able to exclude the people of the other states from the riches of their farms, of their forests, of their mines, and of their factories? Is it not a right of each state that Congress alone, which represents all, shall be the exclusive arbiter of what is right and just in interstate and foreign trade, and that no state shall be permitted to advance itself at the expense, and to the disadvantage of the others, perchance by its narrowness, its greed, and its selfishness in trade?

INTELLIGENT INTERSTATE REGULATION NOW OF SUPREME IMPORTANCE

The existence of this exclusive power in Congress to regulate interstate and foreign commerce is of no less importance—is in fact of far larger importance—as a state's right now, than it was when the Constitution was adopted.

Commerce itself in these one hundred and twenty-six years has assumed a far greater consequence in the affairs and destinies of men and of nations, than it had in those early days. Steam

and electricity have come with their mighty revolutionizing influence and have brought all the states and all the nations into close and intimate commercial relationships. Men no longer deal in trade most largely with their immediate neighbors, but find it essential to their success to have free and unimpeded and adequate access to the markets of the world.

The interests of the producing states—particularly the states of the south and west where there are no markets of the first importance—imperatively require easy and quick transportation to the world's great market cities, such as New York, Philadelphia, Boston, and Chicago in this country, and Liverpool, London, Paris, and Berlin abroad.

It may be safely stated that at least eighty-five per cent of the trade of Tennessee, and of the United States generally, moves in interstate and foreign commerce.

To meet these economic conditions—to satisfy the essential needs and to accommodate the movement of this great traffic—it has become necessary to create long and continuous lines of railroad in the place of the short and disconnected lines which were once adequate to the requirements of trade. These large systems of railroad, which have come in obedience to the economic law which demands continuous, rapid, and unbroken transportation, necessarily extend across, and are, under existing law, in many respects subject to the varying policies of many states.

The problem of greatest magnitude which concerns the country in regard to them, is how their continuity of service shall be preserved unimpeded and what shall be the quality of adequacy and efficiency which their transportation facilities shall possess.

A broad and wise policy in dealing with the instrumentalities of commerce is, therefore, a matter of supreme interest to all the states. A narrow, or niggardly, or selfish policy, if adopted by any one of the states through which a railroad passes, may seriously cripple and depress the commerce of every other state which the railroad serves.

No adequate conception of the railroad problem, as it affects the development of the country and the growth of its commerce, can ignore the necessity that transportation facilities must be all the time growing and improving to keep pace with the growth and expansion of commerce—otherwise there will be no growth or expansion of commerce.

Such an increase in railroad facilities involves the constant input of new capital, for no railroad is ever finished except in a dead country. It is a mere platitude to say that new capital can only be attracted by credit. While no one state through which a railroad passes can alone establish its credit, a single state can impair or destroy it.

If a railroad runs through and serves eleven states, ten of them may be guided by broad and liberal views and may be controlled by the policy of encouraging the establishment and maintenance of adequate transportation facilities. The eleventh may, however, have no adequate commercial outlook or may be temporarily under the domination of small and time-serving politicians. It may reduce rates on state traffic so as to barely escape the line of confiscation. It may be unwilling that its state traffic shall contribute anything to the liberal program, favored by the other ten, which would build for the future and insure the present and continuing adequacy of the transportation facilities on which all are equally dependent.

In such a case, what shall be done? Shall the ten states bow to the will or caprice of the one and allow it to control?

If, on the other hand, the standard of facilities is not brought down to this low level and is to be made adequate to the needs of all, then the commerce of the other ten states, or interstate commerce, or both, must bear the burden, which the dissenting state has refused to share, of building up adequate transportation facilities.

HARMFUL FEATURES OF STATE REGULATION

In either case, the dissenting state, in a very effective way, regulates the commerce and the business opportunities of all.

Moreover, in the Shreveport case, recently decided by the Supreme Court of the United States, and in another state which I shall not more particularly identify, state rates have been greatly reduced for the avowed purpose of preserving state markets for state trade, and thus excluding and discriminating against the trade of other states.

Is it not a right of each of these states, thus oppressed by the narrow and selfish policy of one, to have its commerce freed from these state restrictions and regulated by Congress, representing all the states, in accordance with the compact of the Constitution?

I have referred to the great importance to the welfare of all the states of transportation facilities. In this connection, and as exerting an important influence on the financial capacity of the carriers, it is appropriate to consider their capacity to issue and to dispose of their securities.

It is manifest that, if such issue is to be regulated by the individual states, every state is at the mercy of the others. A bond, to be available in the market, must, as a rule—especially now when most bonds are necessarily junior liens—be secured upon the whole railroad line; and this crosses many states. One of the states, therefore, if it possesses the power to regulate the issue of securities of an interstate carrier, may disappoint and defeat a financial plan approved by all the other states and necessary to the carrier's transportation efficiency.

Even if the state does not press its authority to the extent of absolutely declining to sanction the issue, it may selfishly and as a political expedient, attach a condition that a designated portion of the proceeds shall be spent within its borders where it may not in fact be needed, when the needs of interstate commerce and the commerce of other states fairly require that the whole shall be expended elsewhere.

The power of the state to consent, or to withhold its consent, is equivalent to a power to control the character and the location of additional transportation facilities against the views and the interests of all the other states.

But even if the necessity for the new capital is universally recognized, and the approval of the states is not ultimately withheld, the time necessary to permit the investigation and to secure the approval of so many would, or might, constitute a fatal obstacle in the way of a successful financial operation. Promptness—ability to avail without unreasonable delay of a favorable market—is essential to success in placing large financial offerings.

From whatever standpoint, therefore, it be considered, the destructive effect of a power in the several states to determine and limit the financial capacity of the carriers, through a regulation of the issue of their securities, is apparent. It is manifest that the financial capacity of a carrier which serves many states is a matter of transcendent importance to them all. No one of them should be allowed to control or to injuriously affect it. It is a right of each of the states that a matter so important, and in which all of them have so vital an interest, shall not be controlled by one which may have a selfish interest or an illiberal policy.

It is a right of the states, in respect of this matter of common and supreme concern, that an authority, which is the authority of all, whose power is delegated by all, which represents all and which acts for all, shall alone be the arbiter of what may be conflicting views and interests, and shall alone regulate and control.

And yet sixteen states have enacted statutes, each asserting for itself the individual right to control the issue of stocks and bonds of interstate carriers. And the end is not yet, for many other states are considering legislation which will give to them a power which they see is already being exercised by others.

Another striking illustration of the exercise by one state of a power to discriminate against and to injure the commerce of other states and interstate commerce is found in the state laws which impose heavy penalties for failure to furnish cars or other instrumentalities of commerce within a limited time.

One of the states now imposes a fine of $5 for each day of delay; an adjoining state fixes the fine at $1 per day; and the

interstate commerce law fixes no per diem penalty at all. A case may well be imagined where a carrier is reasonably supplied with equipment, but a large portion of it has moved in the regular channels of commerce to a point on or off its line and distant from the place where the demand for it is made. If, under these circumstances, there is a demand for a car by a shipper of intrastate traffic in the state which imposes a heavy fine for delay, and is also made by a shipper in the state which imposes a light fine and is also made by a shipper in interstate commerce as to which no fine at all is imposed, and there is at the moment, by reason of special circumstances, only one car available to meet all three of these demands, it, of course, results that the carrier in self-protection must deliver the one available car to the shipper in the state which imposes the largest fine, and the other must go without. In other words, the greediest, the most selfish and the most unreasonable state thus secures by its own laws a preference for its own commerce over the commerce of its sister states and over interstate commerce itself.

It is not a right of the other states to have the question of a fair distribution of available car supply determined, not by one of the interested states, but by the authority which represents them all and can see that a rule of equity and fairness shall prevail?

In addition to what has been said, a long and formidable list of state statutes, already in effect, might be given, which, without the consent of the other states, impose serious burdens of expense upon their commerce, and thus upon their people. All discriminate or have the effect of discriminating, against their commerce, both state and interstate.

Thus, three states have passed laws making it illegal for a carrier having repair shops in the state to send any of its equipment, which it is possible to repair there, out of the state for repairs in another state; fifteen states have attempted to secure preferred treatment of their state traffic, either by heavy penalties for delays or by prescribing a minimum movement of freight cars, some of them requiring a minimum movement of 50 miles per day, whereas the average movement for the United States is not over 26 miles per day—one of these states imposing a fine of $10 per hour for the forbidden delay; 20 states have hours-of-service laws, varying from 10 to 16 hours; 20 states have full-crew laws; 28 states have headlight laws, with varying requirements as to the character of the lights, and 14 states have safety-appliance acts.

Let me take an illustration from a single class of these statutes. I will select the full-crew laws of New Jersey and Pennsylvania.

These laws impose upon the railroads operating within their respective limits an expense for unnecessary employes amounting to more than $1,700,000 a year. There is nothing in these state laws putting the burden of this expense on their own traffic alone. That burden extends to all the traffic these railroads carry, and thus the traffic of Virginia and Tennessee and Mississippi and of all the American states whose traffic enters New Jersey or Pennsylvania is laid under tribute by these state enactments.

Or, the proposition may be stated another way. The expense put upon the railroads by the full-crew statutes of these two states would pay the interest at 5 per cent upon a capital fund of more than $34,000,000. By requiring an amount equivalent to the interest on this capital to be expended on useless employes—at least on employes as to which the other states were not consulted—instead of being used to obtain new capital, these two states have by their own independent action reduced the borrowing capacity of the railroads to the extent of $34,000,000. That amount of capital would have bought 1,360 locomotives, or 3,400 steel passenger cars, or 34,000 freight cars, or 1,133,000 tons of steel rails, or would have block-signaled 13,600 miles of road.

Thus, facilities immensely valuable to the traffic of the other states have been made impossible—not by their own action, but by the independent action of New Jersey and Pennsylvania.

STATE REGULATION WHICH VIOLATES "A RIGHT OF THE STATES"

It is apparent that these and similar statutes which impose burdens and create discriminations violate the principle of just and equal treatment as against the states which have a more liberal policy, and constitute serious invasions of the field of regulation by the states which adopt them to the substantial prejudice of those which have not sought to obtain special or preferential treatment.

Again, it may be asked, is it not a right of the states that no one state shall possess the power of imposing a burden which the people of other states must help to bear, or of securing a preference for its own traffic over the traffic of the others?

In order to secure equality of burden and of privilege and the benefit of an adequate and efficient transportation system, the power to regulate commerce among the states and with foreign nations was, by their own action, withdrawn from the individual states and conferred upon Congress, which represents them all.

In fact, it may be truly said that the Constitution itself was the offspring of the insistent demand of the states for protection in trade against the other states. It is, therefore, peculiarly a right of the states to have this purpose fully and fairly carried into effect.

It seems not unprofitable to turn from the problem of commercial regulation, considered only as a problem of peace, to the lessons we must learn in regard to it from the great events now occurring on the continent of Europe.

We had fondly dreamed that the possibility of great wars had disappeared in the purer light of civilization, and that the barbaric and savage instinct of nations had been obliterated by the advance of moral and intellectual principles among mankind.

This dream has been rudely dissipated and the world has been made to realize that, when it comes to war, there has been no advance in humanity or morality since the Goths and Huns and Vandals fought and slew and pillaged fourteen centuries ago. The only difference is a difference in slaying power and in efficiency. The world has marveled to see a nation, with comparatively small territorial possessions, rise in arms against the strongest nations of the earth and defy them all with its organized energy and power.

Whatever may be the ultimate result of this titanic struggle, the lesson of national efficiency has been taught and will never be forgotten. We have had it borne in upon us that the most militant and most efficient nation of Europe has outgrown its territorial limits and is looking for other lands to colonize, into which it will introduce its own national ideals, its own national efficiency and its own militant and aggressive spirit.

If it should happen that her policies embrace the acquisition and colonization of certain parts of South America, our Monroe Doctrine would stand in the path of her ambition. Whatever course we may then pursue—whether we limit the application of this doctrine to North America or undertake to enforce it as to the entire Western Hemisphere—we shall be confronted by greatly increased international complications and will need both national power and national efficiency to deal with the conditions which will be certain to arise.

THE SUPREME NEED OF EFFICIENCY

Steam and Electricity and Science have done their work and have made great nations essential to meet these mighty forces.

Wisdom requires us to recognize the change which these mighty forces and these mighty events have wrought. We cannot step backward and disintegrate ourselves into separate states. We must be efficient as a nation if we are to deal successfully with our national emergencies.

We must realize that the agitation must cease for a divided sovereignty in respect of functions which are in essence national. We must appreciate that efficient transportation is an essential condition of national efficiency, and if we are to halt or weaken our transportation systems at state lines, by permitting the imposition of burdens or the exercise of hurtful, inharmonious or unwise regulation, we will make national efficiency impossible.

Is it wise for us to subject a matter of such universal concern and of such national importance to the uncertain policies and partial and inadequate outlook of a single state? The Constitution confides it to Congress, which represents the general

welfare and common interests of all the states. The evolution of forces, the progress of events, and the growth of nations emphasize the wisdom and necessity of reposing the power of commercial regulation, which so essentially involves the national interest and the national efficiency, in the hands of the authority which is alone responsible to all the people for the performance of national duties and the preservation of our national liberty.

If it was to the interest of the individual states to have a single and impartial regulation of interstate commerce and its instrumentalities when the question was the free introduction into New York of the firewood of Connecticut and the dairy products of New Jersey, it is far more so now in view of the influential relationship which transportation has come to bear to our national efficiency and to the liberties and destinies of our people.

It must also be realized that the regulation of interstate commerce and its instrumentalities is no violation of the rights of the states, is no invasion of their prerogatives, is in no sense in derogation of their reserved sovereignty, but in reality is merely the specific performance of the contract which each state bargained for when it subscribed to the Constitution. It is their convenanted right, and the covenanted right of each of them, as well as their highest interest, that the commerce in which one in common with another state is interested shall be regulated by the fair and impartial judgment of the authority which alone springs from and is responsible to them all.

DERAILMENT ON THE NORTH EASTERN

The British Board of Trade has issued a report, by Lieut. Col. P. G. von Donop, on a derailment at Chaloner Whin, on the North Eastern Railway, two miles south of York, on the night of March 18, about 10 o'clock. No person was killed or injured, but the inspector reports the case in great detail because of the general interest in its causes. The signalman, in disregard of a clearing-house rule, gave authority for the train to leave the last station north of him before he had set up the route over which it was to pass; and when he came to set the switches, including a movable-point frog, he was unable to do so, because of snow. He at once sent two trackmen to clear out the snow; and while he was watching these men at the work the train came on, at high speed, having passed a distant and a home signal set against it. The engineman and fireman say that the distant signal was off, but the inspector finds that this testimony cannot be accepted.

To the claim of the company that the rule forbidding switches to be moved after a train has left the last preceding block station cannot be enforced regularly, the inspector replies that, perhaps, with freight trains this is to be admitted; but with passenger trains, at all events, such difficulties should not arise; the rule should be enforced.

This signal cabin has a torpedo placer, provided for emergencies; but in this case the signalman, watching the men at work on the tracks, did not see the train until it was close to his cabin, and it was then too late to make use of the torpedoes. Moreover the obstruction was only a few yards beyond the cabin.

Continuing, Colonel von Donop says:

"This case is another instance of an accident mainly due to the fact of a driver not noticing that his distant signal was at danger. This is a matter to which the North Eastern Railway Company has, for some years past, been devoting attention; trials have been made by them of different devices for giving the driver an indication on the engine as to the position of the distant signal when he passes it, and over certain portions of the system devices are fixed which are in operation with North Eastern engines. None of them were, however, installed at Chaloner Whin, and even had one of them been installed there it would not have acted in this instance, as the engine, which belonged to the Midland Railway, would not have been equipped with the necessary apparatus. No such device has, however, as yet been decided on for general adoption on the company's system, and they inform me that at the present time the matter is practically at a standstill, as far as their system is concerned; the reason of this is that they consider that it is essential that whatever system is decided on should be universally adopted by all railway companies, and they are therefore waiting until railway companies can agree upon a method suitable for universal adoption. It is understood that a committee has been appointed by the railway companies to consider this matter, and it is hoped that a decision may before long be arrived at."

Engines of six different roads run past Chaloner Whin every day, namely, the North Eastern, the Great Northern, the London & North Western, the Midland, the Great Eastern and the Great Central. These companies own in the aggregate about 14,000 locomotives. There are numerous union stations and junctions, both in England and in Scotland, where conditions much like this prevail.

A SIMPLE METHOD OF CHECKING L. C. L. FREIGHT

A very complete and simple system of securing two independent checks of outbound l. c. l. freight is in force at the new local freight terminal of the Minneapolis, St. Paul & Sault Ste. Marie at Chicago (described in the *Railway Age Gazette* of August 22, 1913). This system was installed when the terminal was opened about a year ago and has been in continuous use since that time with very satisfactory results.

As soon as the general plans for the new terminal were decided upon the local agent and his staff began the study of the methods under which it should be operated. The locations of the cars set at the house were first fixed, placing them so that trains might be made up in station order by doubling from one track to another and eliminating all switching. It is interesting to note a recent performance in this connection whereby without any attempt to make a record one of the regular merchandise trains was made up and passed the Soo Line outer yard, 19 miles out of the terminal 2 hr. and 5 min. after the house was closed. In fixing the location of the cars, those normally loaded heavy were placed next to the house, and cars loaded more lightly on tracks further removed, the refrigerator cars being placed on the outside tracks. In this way trucking through the cars was reduced to the minimum. Permanent numbers were assigned to these locations, eight numbers being allotted to each door or run, as for instance, 81 to 88.

				Mdse.Car	Rfr.Car	Load
	Abbotsford	Wis	Soo	54	108	W&S
X	Ackerville	"	"	85	48	D
	Adams Center	"	"	84	68	D
	Addison	"	"	85	48	D
X	Agnew	"	"	34	108	M&S
	Agenda	"	"	34	108	W&S
	Albertville	"	"	92	88	M&S
	Alden	"	"	92	88	M&W
	Algoma	"	GB&W	104	68	D
	Allen	"	F&NE	44	68	D
	Allenton	"	Soo	85	48	D
	Allouez	"	G N	111	78	D
	"	"	N P	63	68	D
	"	"	DSS&A	73	68	D
	Alloa	"	Soo	84	68	D
	Alma Center	"	GB&W	104	68	D
	Almenda	"	Soo	53	98	M&F
	Aloia	"	"	75	48	D
	Alpha	"	N P	121	78	D
	Alstad	"	" "	121	78	D
	Altdorf	"	Soo	54	68	D
X	Altamont	"	DSS&A	73	68	D
X	Alverno	"	Soo	124	58	D
X	Ambridge	"	"	123	68	D

X Prepaid stations M&S Monday and Saturday
D Daily W&S Wednesday and Saturday

Fig. 1—Sample Page from Receiving Clerk's Book

Having determined on the car locations a complete list of all stations for which freight can be received at this terminal was very carefully prepared from the tariffs. This list was made alphabetically and was grouped by states and provinces, a con-

siderable amount of freight being received here for points in western Canada. Where alternate routes exist, as for instance to Allouez in Fig. 1, these are given separately. Opposite each station is placed the road over which freight should be forwarded and the number of the location of the car at the house in which it should be loaded with a symbol indicating the days on which refrigerator cars are loaded for those points.

A copy of this complete list is given to the receiving clerk at each receiving door. As freight is received the caller calls the destination to the receiving clerk, who secures the car location from the book and marks the number of the run on the

GATEWAY CAR - ALPHABETICAL ORDER				WAY CAR - STATION ORDER		
BLOCK 51				BLOCK 85		
Winnipeg and Beyond						
Acheson	Alta.	Balgonie	Sask.	Waukesha	Wis.	First Out
Alix	"	Baring	"	Duplainville	"	
Ansell	"	Biggar	"	Templeton	"	
Ardrossan	"	Bender	"	Colgate	"	
Abernethy	Sask.	Blucher	"	St. Huberts Spur	"	
Adair	"	Bounty	"	Rugby Jct.	"	
Adanac	"	Bredenbury	"	Ackerville	"	
Alameda	"	Broadacres	"	Schleisingerville	"	
Albatross	"	Broadview	"	Cedar Lake	"	
Alida	"	Brora	"	Allenton	"	
Amazon	"	Buccleugh	"	Marsh	"	
Anglia	"	Bulyea	"	Theresa	"	
Antler	"	Burrows	"	Lomira	"	
Arcola	"	Balcarres	"	Byron	"	
Armilla	"	Bangor	"	Hamilton	"	
Asquith	"	Battleford	"	Boland	"	Last Out

Fig. 2—Sample Pages from Stower's Book

shipping bill while the caller marks it in chalk on the box. Freight for destinations not shown in the book is refused by the receiving clerk. The truckers then take the freight to the runs and cars indicated by the chalk marks.

Another list is prepared for the use of the stowers, showing all points for which freight may be loaded in each car, the stations being shown in alphabetical order for "gateway" and in station order for way cars. A separate sheet is prepared for each car. These lists for each run are bound separately into books for the use of the stowers in charge of those runs and show only the stations for which he can load. When freight is brought to a run by a trucker the stower disregards entirely the previous chalk marks. Noting the destination on the box he refers to his book to satisfy himself that this freight belongs

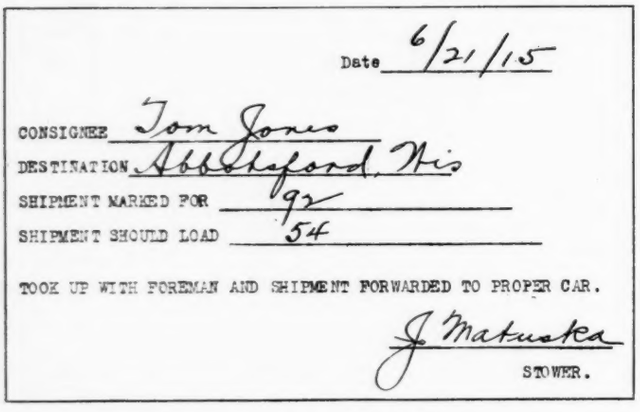


Fig. 3—Stower's Report on Errors

in his run and determines the car in which it belongs as well as the position in the car, if a way car. If he cannot find the station in his book, he refuses to accept the freight and fills out all but the fourth line in the slip shown in Fig. 3, sending it with the freight to the foreman, who investigates and designates where it should go.

In this way there are two entirely independent checks on the loading of each piece of freight. While it is possible for both the receiving clerk and the stower to make errors with the same box, this is not usual and the stowers catch from 8 to 10 errors daily, all of which have passed the receiving clerks and would otherwise be loaded in the wrong car. While all of the stowers are foreigners with only a very meager knowledge of English, it is surprising to see the care with which they detect errors. All mistakes caught by them are investigated by the foreman. If the number chalked on the box is incorrect, while the shipping bill shows the correct run, the error arose from the caller writing it down incorrectly, while if the run number on both the bill and the freight is wrong, the fault evidently lies with the receiving clerk who called it. Likewise, all "overs" found on the line caused by wrong loading are reported by car number and the responsibility placed with the stower at fault.

Since each of these 8 or 10 errors caught daily by the stowers would have gone wrong otherwise, the payments for claims on freight shipped from Chicago have shown a material decrease, although no definite comparison has been made. Aside from this, each receiving clerk has at hand for ready reference, a complete list of the stations for which freight can be accepted and he has no excuse for accepting freight which cannot be handled by this line. He also has no excuse for guessing at the car in which irregular shipments should go, and it is not necessary for him to consult the foreman in such instances. Likewise, the foreman is relieved from work of this nature and can devote his entire time to supervision. While these lists necessarily had to be compiled with great care to include all stations correctly, after once being prepared it has enabled a double check to be secured on all shipments with no increased labor or delay.

This system was devised and put into operation by J. Corrigan, local agent of the "Soo" Line, Chicago, Ill.

ELECTRIC LOCOMOTIVE WITH STEAM LOCOMOTIVE CHARACTERISTICS

By Q. W. Hershey

In the usual operation with steam locomotives where long, heavy trains are being handled, with one or more locomotives on the head-end and one or more locomotives doing pusher service, concurrent starting of the head-end and pusher locomotives is secured by signaling with the whistle. Little or no difficulty in starting heavy trains in this manner is experienced owing to the well known characteristic of the steam locomotive to take up slack and stand against the load.

In connection with the electrification of the Elkhorn grade of the Norfolk & Western* the practical necessity that the locomotives be able to take up slack to their full tractive effort and stand stationary against the load until the action of the locomotives on both ends of the train becomes concurrent, was taken into consideration in the design of the electric locomotives. The traffic on the Elkhorn grade consists almost wholly of long heavy tonnage trains which are operated under such conditions that there is difficulty in securing simultaneous action in the starting and stopping of the locomotives at opposite ends of the trains.

The use of three-phase current at the motors has made posible the application of polyphase induction motors designed and constructed without commutators or commutating devices of any kind. They are therefore not subject to sparking, burning, pitting or brush troubles which would be found with ordinary direct current or series type motors. The peculiar "hang-on" feature of the alternating current locomotive is available entirely on account of the inherent characteristics of the induction motor; and the Norfolk & Western locomotives have been designed to approximate very closely steam locomotive characteristics which are necessary to make practicable the use of heavy electric locomotives for long train, heavy tonnage service, such as is found on the Norfolk & Western.

*For a description of the Elkhorn grade electrification, including a description of the locomotives, see the *Railway Age Gazette* issue of June 4, page 1153.

Hearing on Advances in Western Passenger Fares

Roads Present Testimony to Interstate Commerce Commission Why Passenger Revenues Should Be Increased

Examiner Thurtell of the Interstate Commerce Commission began a hearing at the Hotel La Salle, Chicago, on Tuesday, July 6, on advances in passenger fares in the territory west and southwest of Chicago to the Rocky mountains, sought by 46 roads. The tariffs were filed by the roads early in the year and were suspended by the commission under Investigation and Suspension Docket 600. It is expected that it will take about two weeks in all to hear both sides, the carriers presenting their testimony first.

The railways' case is being handled by two committees of attorneys, one for the roads in the Northwest, and the other for the Southwest. The committee for the Northwest consists of C. C. Wright, general solicitor of the Chicago & Northwestern, chairman; O. W. Dynes, commerce counsel, Chicago, Milwaukee & St. Paul; E. C. Lindley, general solicitor, Great Northern; R. B. Scott, interstate commerce attorney, Chicago, Burlington & Quincy; H. A. Scandrett, interstate commerce attorney, Union Pacific; and Charles Donnelly, assistant general counsel, Northern Pacific.

The Southwestern committee consists of S. T. Bledsoe, chairman, assistant general counsel, Atchison, Topeka & Santa Fe; H. G. Herbel, general attorney, Missouri Pacific; W. T. Hughes, assistant general attorney, Chicago, Rock Island & Pacific; E. T. Miller, general attorney, St. Louis & San Francisco; and C. S. Burg, interstate commerce attorney, Missouri, Kansas & Texas.

The railroads are opposed by a committee of State Commissioners, headed by P. W. Dougherty, of the South Dakota Railroad Commission, who was delegated by the protesting State Commissions to conduct the case, assisted by A. E. Helm of the Kansas Public Utilities Commission.

Mr. Wright made an opening statement on behalf of the roads in part as follows:

OPENING STATEMENT OF C. C. WRIGHT

"The proposed advance in passenger fares, covers the territory from Chicago west and southwest to the Rocky mountains, including Wisconsin, the northern peninsula of Michigan, Minnesota, Iowa, Missouri, Arkansas, Louisiana, Texas, Oklahoma, Kansas, Nebraska, North and South Dakota. It also includes the interstate rates from Illinois west.

"Of that territory, Wisconsin, Michigan, Illinois, Iowa, Missouri, Minnesota, Nebraska, Kansas and Oklahoma now have rates adjusted on a basis of 2 cents per passenger mile. North and South Dakota are upon the basis of 2½ cents per passenger mile. Arkansas, Louisiana and Texas are upon the basis of 3 cents. The territory west of the states described, viz, Montana, Wyoming, Colorado and New Mexico, has rates practically on a basis of 3 cents per mile. The advance in the passenger rates in the states named necessarily includes an advance in rates from and to that territory from districts in which no advance is proposed.

"The lines operating in Trunk Line and Central Passenger Association territory, that is, from Chicago and St. Louis east to the Atlantic Coast, have generally advanced their rates to the basis of 2½ cents per passenger mile, with mileage books at the rate of 2¼ cents per mile. In the territory involved in the present proceeding, which lies east of the Missouri river and west of the Missouri river on and north of the Union Pacific in Kansas, the rates under suspension are upon the same basis, with mileage books at 2¼ cents per mile. In the territory south of the Union Pacific in Kansas and west of the Missouri river, the proposed rates are upon the basis of 3 cents, with mileage books at 2½ cents. The passenger rates have been advanced by the carriers under the conviction that the earnings from the passenger business are not sufficient to provide the necessary passenger service and yield a fair return upon the property devoted to that service. It is believed the evidence will demonstrate, that the passenger service is not paying a fair share of the expenses of the maintenance of the roads, and that the evidence will show that the ratio of profit and the net rate of return from the passenger business, are materially less than the return from the freight business.

"The carriers will follow substantially the same lines as in the recent freight advance case. It was stipulated that the testimony taken in that case in relation to the general financial needs of the carriers, may be treated as part of the evidence in this case. The carriers have taken the same roads which were involved in the composite showing and added thereto the Union Pacific, Great Northern, Northern Pacific, Duluth, South Shore & Atlantic, Toledo, Peoria & Western and Texas Midland, and eliminated the Chicago & Eastern Illinois, whose interstate rates were already advanced by permission of the commission.

"The operated line covered includes a little over 120,000 miles. Not all of the mileage included lies within the territory where the advance is sought. Lines like the Union Pacific, Santa Fe, Great Northern, Northern Pacific and some others, now maintain a 2½-cent or 3-cent basis on the larger portion of their mileage. Different groups of roads have been considered together and the composite results of operation shown, as was done in the freight case, for the purpose of eliminating the effect of rates on portions of the lines which lie outside the territory involved.

"The results of passenger operation for the last 14 years will be presented to the commission, divided into two periods of 7 years each, giving the results for each year, both as to the entire systems interested in the proceeding and as to the group which will be presented.

"It will be shown that the passenger revenue on these roads in 1914 was approximately $271,000,000. Not all of this is affected by the advance. It is impossible to determine exactly what may be the effect upon the revenue in the territory involved, owing to the fact that under the proposed rates mileage books will be sold at less than the regular rate. It is believed that the advance will not amount to more than 8 or 9 per cent of the revenue in the territory in question, or in round figures, from $20,000,000 to $25,000,000.

"The carriers expect to show that the net operating income of those involved, during the last 7 years, has been materially less per mile of road than for the 7 years prior. It will be shown, that this is true, notwithstanding an increase in the volume of business and in property investment. This, of course, results in a materially higher operating ratio and a less net rate of return than has been maintained heretofore.

"Comparisons will also be made to present the conditions at the present time with those in 1910. It will be shown that this increase in expenses is largely due to the increase in cost of labor and rate of taxation, and that the economies which have been effected and the increased volume of business have not been sufficient to meet the increasing costs of operation.

"Taking the lines together, it will be shown that under any of the bases of division of expenses, as between passenger and freight, the return upon property devoted to passenger service does not amount to 3 per cent upon the value of the property devoted to such service.

"In the present case the carriers will treat the passenger rates as a whole, without an attempt to make definite separation of expenses as between state and interstate business. Information will be furnished, however, as to the proportion of the business which is state and interstate, the length of haul on each class of business and other matters of that kind affecting the passenger traffic. It is believed by the carriers that it is impracti-

cable to maintain state and interstate passenger rates upon any substantially different basis. This belief is based on the thought that to maintain any substantially different basis of passenger rates on interstate business would not only be discriminatory, but would be impractical from an operating standpoint."

The first witness for the railroads was L. E. Wettling, who has had charge of the compilation of the fundamental statistical exhibits.

STATISTICAL EXHIBITS

Mr. Wettling filed and gave testimony in explanation of a statistical exhibit of 217 pages, giving the results of operation, traffic statistics, etc., for the 46 roads or systems involved in the case for each year from 1901 to 1914, inclusive, with comparisons of the periods 1901-1907 and 1908-1914. The figures were given for the individual roads, for all the roads combined, and for the roads combined into 7 groups. A large number of the exhibits were like those presented by Mr. Wettling in the freight advance case, which were described in the *Railway Age Gazette* of March 12, except that only 41 roads were included in that case.

The 46 roads operated 120,790 miles of line in 1914. Their net cost of road and equipment was $6,433,968,625 and the net operating income for the year was 4.24 per cent on that amount, or equivalent to 7 per cent on a value of $3,898,830,406 or $32,278 per mile. For the period 1901-1907 the net operating income was $2,509 per mile. For the period 1908-1914 it was only $2,394 per mile. For the first period this was 5.43 per cent of the cost of road and equipment. For the second period the return was 4.74 per cent. In 1914 the net cost of road and equipment had increased 64.04 per cent, as compared with 1901. In the same time operating revenue had increased 105.85 per cent and the ratio of operating revenue to cost of road and equipment had increased from 14.21 per cent to 17.84 per cent. Operating expenses meanwhile had increased 137.96 per cent and the operating ratio from 65.94 to 76.22, while the net operating income had increased only 43.71 per cent. The cost of road and equipment per mile of line owned increased from $48,878 in the first period to 54,907 in the second period.

The total increase in capitalization, 1914 over 1901, was $2,858,553,071. In 1901, 46.42 per cent of the total was represented by stock and 53.58 per cent by bonds. In 1914 the proportion was 40.71 per cent of stock and 59.29 per cent bonds. From July 1, 1907, to June 30, 1914, the 46 roads expended $936,818,405 for additions and betterments, of which $390,435,682 was for equipment.

For the first period gross operating revenues per mile averaged $7,713, of which $3,003 was paid for labor, $240 for taxes and $1,958 for material and other items, leaving a balance of $2,509 per mile available for interest, dividends and surplus. For the second period, while gross operating revenues had increased to $9,160 per mile $3,849 was paid for labor, $379 for taxes and $2,536 for material and other items, leaving a balance of $2,394 available for interest, dividends and surplus.

One exhibit showed that the requirements in the next seven years for refunding or refinancing maturing obligations now outstanding would amount to $538,591,699 for 33 operating systems of which $100,764,614 will mature in 1915.

A large number of exhibits were devoted to maintenance expenses. For the first period total maintenance averaged 25.59 per cent of operating revenue and 4.6 per cent of the cost of road and equipment. For the second period the average was 27.76 per cent of operating revenue and 5.3 per cent of cost of road and equipment. For maintenance of way and structures the averages were 13.86 per cent of operating revenue and 2.49 per cent of road and equipment for the first period and 13.54 and 2.59 per cent respectively, for the second period. Maintenance of equipment had taken 11.73 and 2.11 per cent, respectively, for the first period and 14.22 and 2.71 per cent for the second period. While the proportion of maintenance of way and structures charged to passenger service had decreased from .577 cent per passenger mile in the first period to .5084 cent in the second period, the cost of maintenanace of equipment in passenger service increased from .2983 cent per passenger mile for the first period to .324 cent for the second period.

Several exhibits were devoted to the increases in taxes and in expenditures for labor. In 1914 the 46 roads paid $28,025,956 more for taxes than they would have paid at the 1901 rate, and $101,806,957 more for labor than they would have paid at the 1900 rates.

From 1900 to 1914 the average daily compensation, including general officers, increased steadily from $2.00 to $2.52, and excluding, general officers, from $1.96 to $2.48. In 1901, 37.77 cents out of each dollar of revenue was paid for labor; in 1914, 42.98 cents. In 1901, out of each dollar 3.17 cents was paid in taxes; in 1914, 4.97 cents. Labor costs per train mile showed a steady increase, with the exception of only one year, from 66.14 cents in 1901 to 103.98 cents in 1914. Total labor costs per car mile showed an increase from 4.05 cents in 1901 to 5.48 cents in 1914.

For the period 1901-1907 locomotive repairs, renewals, depreciation and charges to profit and loss per locomotive mile averaged 7.215 cents. For the period 1908-1914 the average was 10.689 cents. Repairs and renewals per locomotive mile were 6.983 cents in the first period and 9.399 cents in the second period, while charges to depreciation and profit and loss per locomotive mile were .232 cent in the first period and 1.290 cents in the second period.

One of the exhibits was a chart showing graphically the disposition of each dollar of revenue paid to the 46 roads by the public. In 1901 operating expenses, including taxes, took 65.94 cents, leaving a balance of 34.06 cents available for interest, dividends and surplus. Labor consumed 37.77 cents, taxes 3.17 cents and material and other items 25 cents. In 1914 operating expenses and taxes took 76.22 cents of each dollar, leaving 23.78 cents for interest, dividends and surplus. Labor consumed 42.98 cents, taxes 4.97 cents and material and other items 28.27 cents. Operating expenses were divided between freight and passenger service on six different bases. Basis 6, an average of the results obtained by the other bases, assigned 57.93 per cent of the maintenance of way and structure expenses to freight and 42.07 per cent to passenger, and 67.22 per cent of total operating expenses to freight and 32.78 per cent to passenger.

The average revenue per passenger mile for the period 1901-1907 was 2.13 cents and for the period 1908-1914 was 2.07 cents. In 1901 it was 2.18 cents and in 1914 it was 2.09. Several exhibits were devoted to passenger traffic statistics for 30 states and two Canadian provinces for 40 roads for 1914. The average passenger mileage per mile of line was 107,322, of which 53,294 was intrastate and 54,028 was interstate. The total passenger revenue was $246,432,097, of which $123,611,446 was intrastate and $122,820,650 was interstate. The average haul was 44.8 miles, but the average haul intrastate was only 28.67 miles as against 100.63 miles interstate. Because of the shorter average haul in intrastate business, out of a total of 263,327,957 revenue passengers, 204,312,678 were intrastate and 59,015,279 interstate. The number of passengers carried one mile was 11,796,186,229, made up of 5,857,738,762 intrastate and 5,938,447,467 interstate. The average revenue per passenger mile was 2.089 cents, on intrastate traffic 2.110 cents, and on interstate traffic 2.068 cents. The revenue per passenger mile ranged from 1.569 cents in Illinois to 7.606 in Nevada for intrastate traffic and from 1.872 cents in Wisconsin to 2.708 in British Columbia for interstate traffic. The average revenue per train mile was $1.0770, ranging from 5.71 cents in Nevada to $1.4893 in Tennessee, and the average revenue per car mile was 26.74 cents, ranging from 5.71 cents in Nevada to 35.75 cents in Oregon. The total passenger train mileage was 228,803,538,

including mixed train mileage, and the total car miles of cars carrying passengers was 921,682,764.

Total failure of predictions made in 1907, when passenger fares in many states were reduced to 2 cents per mile, that the lower fares would be more than offset by the stimulus to travel, was also described in figures by Mr. Wettling. He presented statistics showing that the return on property devoted to passenger service is only 2.37 per cent, while many roads operate at an actual deficit.

"The reductions to 2 cents per mile in passenger fares," said Mr. Wettling, "brought no stimulus to travel such as was anticipated. The mileage traveled by passengers for each mile of road in 1901 was 62,757. This had grown by 1914 to 107,255, a gain of 70.91 per cent. In the seven years ending with 1907, when the rates were reduced, the increase in travel was from 62,757 passenger miles per mile of road in 1901 to 95,235 in 1907, a gain of 51.75 per cent. In the seven years after the rates were reduced the gain was from 99,040 passenger miles per mile of line in 1908 to 107,255 in 1914, a gain of only a little over 8 per cent, compared with the 51.75 per cent gain in the seven years before the rates were forced down.

"On top of this failure of the growth in travel to hold its pace, there was, resulting from the rate reductions, a gradual decline in the average revenue, both for hauling the ton one mile and for carrying the passenger one mile. The average revenue per ton mile in the first seven years from 1901 to 1907 was 8.63 mills, which declined in the second seven years to an average of 8.58 mills and amounted in 1914 to only 8.42 mills. The average revenue per passenger mile in the first seven years was 2.13 cents and in the second 2.07 cents.

"Efforts at efficiency, to offset the adverse factors of rising costs and falling rates, although they have brought conspicuous results have not been adequate. With larger power and equipment and denser traffic, the tons carried per train on these railroads rose from 241 in 1901 to 387 in 1914, but the tons per car, in spite of the larger and heavier equipment, rose only from 10.10 tons to 12.27 in the same time. The number of pasengers per train rose from 37.22 in 1901 to 51.82 in 1914 and the passengers per car rose in the same time from 7.56 to 9.31. All of this represents greater efficiency in handling traffic, in spite of which the earning power has declined.

"In providing the service demanded by the public, there has been a steady gain in number, size and value of equipment. On June 30, 1906, there was a total of 11,959 passenger cars owned or leased by 42 of these railroads, of which 11,899 were wooden cars, 60 were steel underframe and none were all-steel. The average value of all was $5,740 and the average weight 71,307 pounds. On June 30, 1914, there were in service 16,958 cars, of which 13,030 were wooden, 1,636 were steel underframe and 2,292 were all-steel. The average value had risen to $7,409 and the average weight to 85,291 pounds. The average value of the all-steel cars was $12,343 and their average weight 121,170 pounds. On June 30, 1914, there were 167 passenger train cars, including Pullmans, owned or leased for every 1,000 miles of road, against 139 in 1906. There were in service June 30, 1914, 21,331 locomotives against 15,691, June 30, 1906. Of these there were in the passenger service in 1914, 5,108 locomotives with an average weight of 116.85 tons against only 3,978 in 1906 with an average weight of only 87.42 tons.

"As the result of decreased rates and higher expenses, the profit from passenger service is excessively small and on some of the roads, especially in the Southwest, the passenger service is operated at a deficit. This has been determined by a separation of operating costs between freight and passenger service. In 1914, 67.22 per cent of all operating expenses were due to freight service and 32.78 per cent to passenger. The average ratio of expenses to revenue in both services was 76.22 per cent. The ratio in the freight service was 72.51 per cent, while in the passenger service the ratio of expense to revenue was 85.16 per cent.

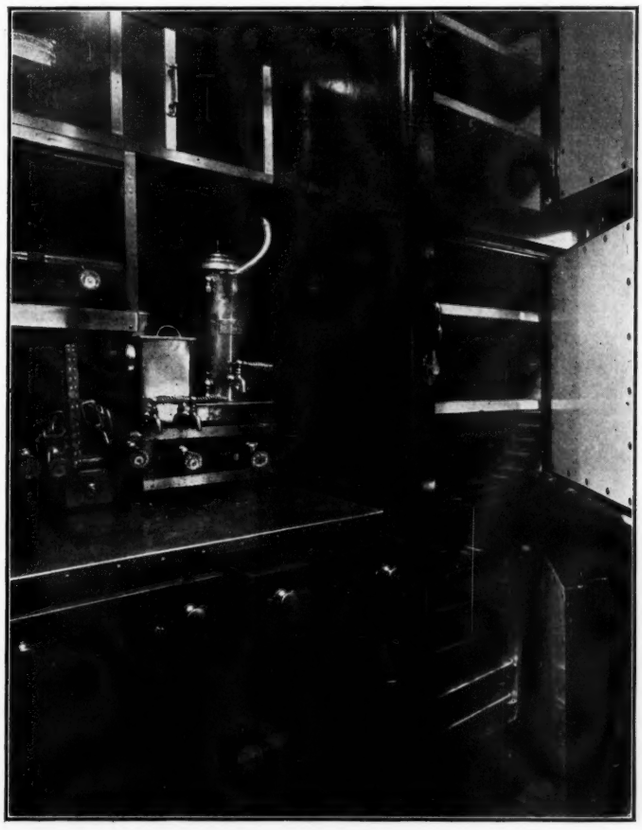
"Both services combined earned a net return equalling 4.24 per cent on the value of the property. In the freight service alone the return was 5.15 per cent while the passenger service earned only 2.37 per cent on the value of the property devoted to passenger traffic on all of these 46 railroads as a whole."

The replies of the various roads to the series of 18 questions bearing on the reasonableness of existing passenger fares which were submitted by the commission some time ago, were filed at the opening of the hearing.

Mr. Wettling was to be followed on the witness stand by E. E. MacLeod, chairman of the Western Passenger Association, E. L. Bevington, secretary of the Transcontinental Passenger Association, W. J. Cannon, assistant general passenger agent of the Chicago, Milwaukee & St. Paul, and H. H. Butler, assistant general passenger agent of the Missouri Pacific.

CAFÉ DAY COACH

The Pennsylvania Railroad has equipped, and put in service, an all-steel cafe day coach, provided with a broiler buffet from which meals will be served. This car will be tried out as an experiment, and if it is found to meet a sufficient demand on the part of the traveling public, others of like character may be placed in operation. It will not be used, however, to supplant dining cars.

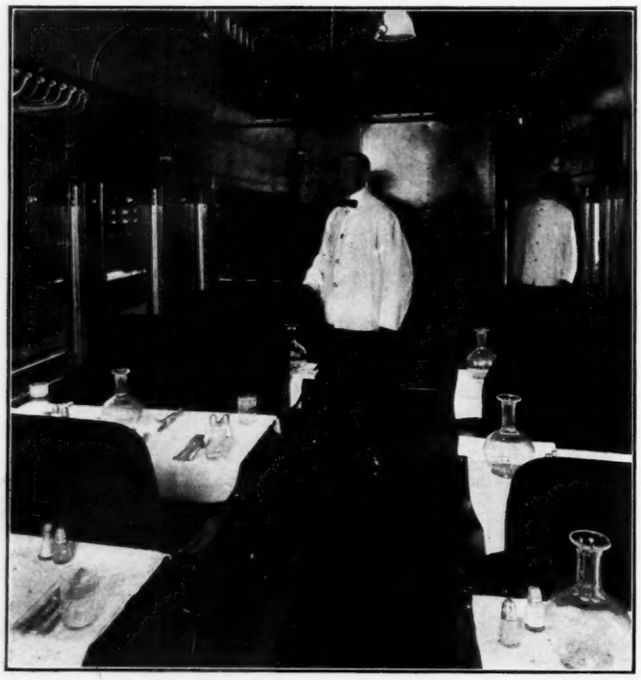


The Kitchen of the Cafe Coach

The new car is intended for use on trains where a dining car is not warranted. The buffet occupies eight feet of space at one end of the car and is similar to those installed in broiler-buffet Pullman cars, but is of an improved type, alcohol broilers being

used instead of coal fires. Meals will be served on tables placed between the seats, with the outer ends resting on the arms. Both single and double tables are provided, the latter being used where two seats are turned to face each other. With a double table, a party of four can eat together. No extra fare will be charged for riding in the car, as it will be in the regular service as an ordinary day coach.

The car has a seating capacity of 70, and except for the buffet it is exactly like the steel day coaches used by the Pennsylvania. A supplementary use for this car will be to serve breakfasts in



Interior of the Pennsylvania Railroad Cafe Coach

sleeping cars on trains where no buffets or dining cars are provided. The new car has been placed in service between Kane, Pa., and Erie, Pa., on trains Nos. 39 and 54, which are through trains between Philadelphia and Erie.

NEW DELAWARE & HUDSON TERMINAL AT ALBANY, N. Y.

The Delaware & Hudson has recently completed and moved into a new office building and freight house in Albany, N. Y., which is of unusually fine appearance for a structure of this kind and is situated in a very convenient location. The entire project is an example of co-operation between the municipality and the railroad to their mutual advantage.

The building occupies a portion of the site of Beverwycke, the original Dutch settlement which covered an area of about 8 acres between Broadway and the river at the foot of Main street. Resisting the trend of modern advancement, this district retained its century-old characteristics, with ancient buildings, many falling into decay, on narrow and crooked streets, and had long been an eyesore to the citizens of Albany. The matter was finally taken up by the local Chamber of Commerce, which prevailed upon the city administration to extend the scheme of river front improvement which had already been undertaken, to include the creation of a civic center in what was the most unsightly section of the city. The Delaware & Hudson, whose main tracks occupied a narrow strip of right of way adjacent to the river had already begun the purchase of some property in this district. The company had a freight house at Livingston avenue, five blocks north, and another at Church street, ten blocks south, both of which had become inadequate. They were also located too far from the business center for convenience. The plan finally determined on by the road provided for a new freight terminal of adequate size in the heart of the business center. It was also desired to raise the main passenger tracks to the level of those of the Union station located two blocks north and to connect them to the present station tracks. At the present time the Delaware & Hudson trains depart from tracks adjacent to but considerably below the main station tracks. This change in grade will also avoid trouble with occasional high water in the Hudson river. While the office building and freight house are now completed, the station tracks have not yet been raised.

Because of the common interest involved it was necessary for the city to co-operate with the railway company in the exchange of property and it was finally agreed that the railway would be granted permission to elevate its tracks and extend its terminal facilities by the construction of a new freight house and yard on condition that the office building be of such a character as to harmonize with the plans outlined by the city for the remainder of the district.

The plan agreed upon is shown in the accompanying general

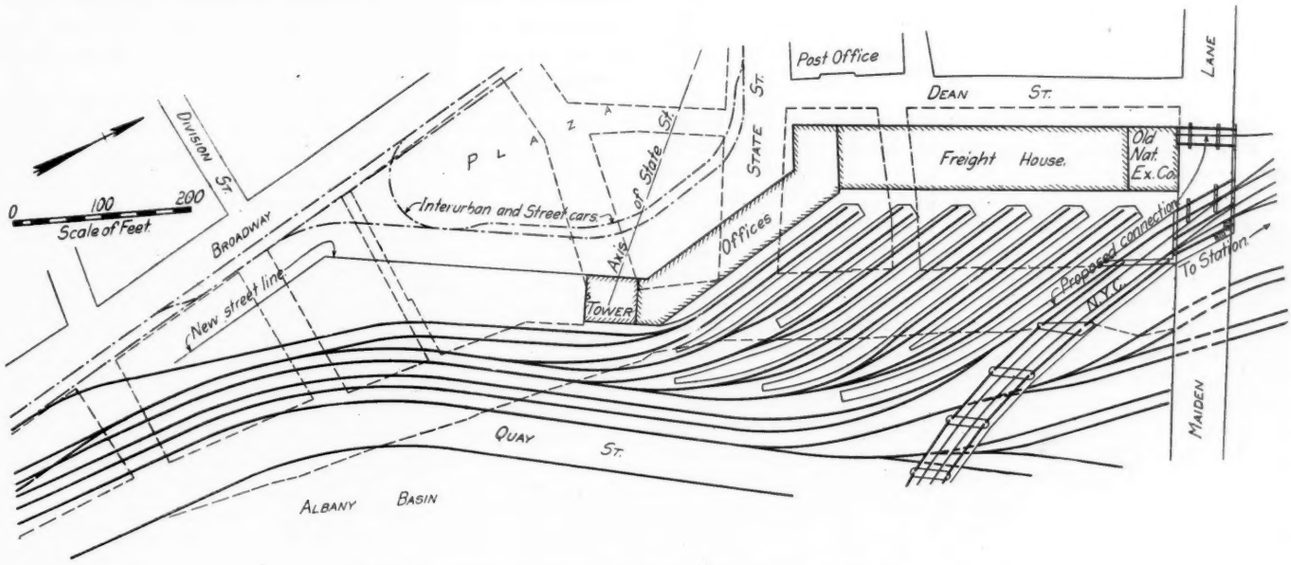
New D. & H. Office Building from the City Side

layout. The building occupies an irregular area between the tracks and the plaza, an open space roughly triangular in shape, bounded on the west by Broadway, with its axis approximately on the center line of State street, an avenue 100 ft. wide, which connects the plaza with the state capitol grounds four blocks west. Just south of the building is a pedestrian subway leading from the plaza east underneath the tracks to Quay street, abutting on Albany basin, an artificial body of water 200 ft. wide, separated from the Hudson river by the municipal recreation pier.

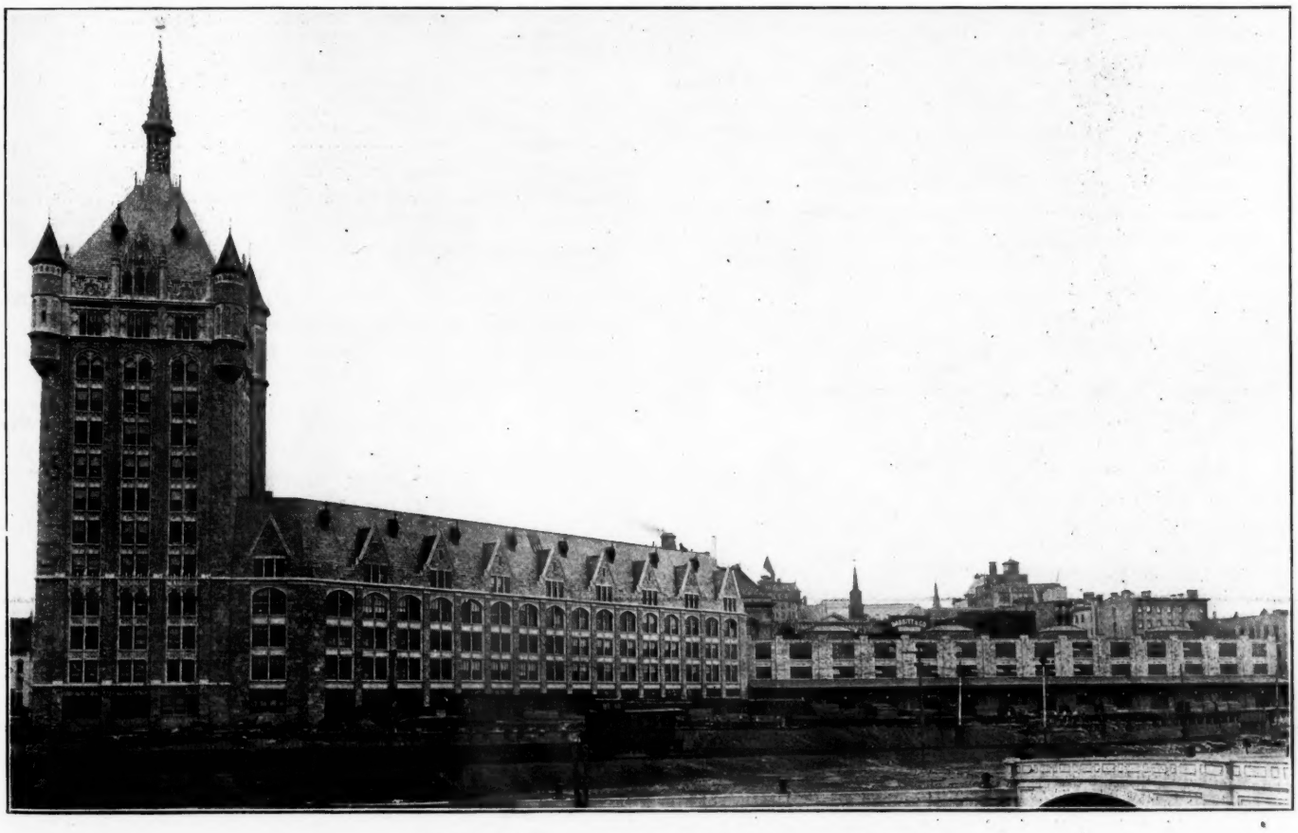
The building, which was designed by Marcus T. Reynolds, architect, Albany, consists of a tower 52 ft. by 62 ft., 13 stories in height, joined on the north by a four-story wing 260 ft. long by 50 ft. wide. To the north of this, and facing on Dean street, is the freight house. Flemish Gothic in design, the building is of imposing appearance and has an unusually fine setting, with the axis of the tower on the center line of State street facing the State capitol. It is also conspicuous from the river side, being the first building of importance to meet the eyes of travelers approaching the city on river steamers, or by trains crossing the river bridge just north of the building. The exterior walls are of Plymouth seam-faced granite, laid in random ashlar and

trimmed with Gothic details of synthetic stone. This synthetic or artificial stone for the trim was made by a special patented process using sand molds and has an excellent finish. The material is well adapted to the use of elaborate details. The roof is covered with heavy slate of variegated colors, the lower course being 1 in. thick and graded to the customary size at the ridge. The tower is crowned with a copper covered spire 70 ft. in height, bearing a weather vane representing Hendrick Hudson's ship "De Halve Maen."

With the exception of the first floor, the tower and its wings are used entirely for the general offices of the road, having a total area of 128,000 sq. ft. An open arcade facing west on the first story permits passage under cover throughout the length of the building, and facing on this arcade and the plaza beyond are seven shops which may be rented out for various purposes, one being occupied by the city ticket office of the Delaware & Hudson. A well in the center of the tower, isolated by fireproof walls and doors, contains two elevators and a stairway. Another stairway and elevator are located midway in the length of the wing. One unusual feature of the tower, combining utility and architectural enhancement is a turret-shaped pilaster located in the northwest corner, which contains a winding stair-



General Layout of Delaware & Hudson Terminal at Albany



Office Building and Freight House from the River Side

way. Being protected by fireproof doors and small fireproof windows, it will afford an unusually efficient fire escape.

The entire building is supported on Raymond concrete piles. The tower is of fireproof steel-skeleton construction, while the wing and the freight house are of reinforced concrete flat slab construction. There is no basement except under the north end of the wing, which is occupied by the heating plant, consisting of three Mills sectional safety boilers. A Custodis radial brick chimney of 42 in. inside diameter, extending only a short distance above the roof, is enclosed above the basement in a fireproof ventilating flue.

The freight house consists of a new three-story portion 317 ft. by 70 ft., designed to take one additional floor in the future, and an old 4-story brick building 73 ft. by 63 ft. on the north, facing on Maiden Lane, formerly owned and occupied by the National Express Company, and now remodeled for use in conjunction with the new building. The first floor is used as an ordinary freight house, the second for storage and the third for offices for the freight clerks, while the upper floors of the old express building will be used for division offices. The new portion consists of 14 bays, 23 ft. 2 in. center to center of columns, with one double rolling door 11 ft. 6 in. wide to each bay, on both the street and the track sides. There are four stairways, one to every third bay, isolated by fire walls and fire-resisting doors. Adjacent to two of these stairways there are freight elevators with 8 ft. by 9 ft. platforms, while next to each of the other two are 8 ft. by 9 ft. platform scales equipped with Springfield automatic weighers of 10,000 lb. capacity. All three floors of the freight house are equipped with automatic sprinklers. Openings leading into adjoining portions of the building are protected by automatic fire doors. The floors throughout the office building and the new freight house are of concrete. The first and second floors of the freight house are illuminated by ceiling outlets, one in the center of each panel, equipped with 100-watt incandescent lamps and reflectors, while over each freight door is a 100-watt lamp, set with the axis of lamp and reflector horizontal.

The layout of the tracks and platform is shown in the accompanying drawing. Twelve house tracks with a total capacity of 100 cars, are located in pairs 12 ft. center to center, on a skew with the face of the building. Platforms between each pair of tracks are 12 ft. wide and connect to a head platform 17 ft. wide along the face of the house. In order to work out with a future arrangement of the main tracks at a higher grade, the house tracks are on a 1½ per cent grade descending toward the house, which is protected against runaway cars by heavy concrete bumping posts. The platforms are entirely of timber construction supported on small concrete pedestals, because it was thought undesirable to use permanent construction at this time on the filled ground which they occupy. It is proposed to replace them by permanent structures when renewal becomes necessary.

In addition to the new freight house facilities a new team yard has been provided some distance south of the station along Church street, from Pruyn street to Ferry street, a distance of about 1,300 ft., which will give eventually a capacity of about 150 cars. Plans are also under way for an express building on Maiden Lane for the United Traction Company, which operates the street cars in Albany, and serves also as a terminal transfer between the Delaware & Hudson and two interurban lines—the Albany Southern and the Schenectady Railway.

All work on the entire building was under contract to J. Henry Miller, Inc., Baltimore, Md., the contract price being $610,000. The total cost of the terminal work to date, exclusive of real estate, is about $750,000. The work on the building was prosecuted with unusual speed. Preliminary work was commenced in April, 1914, and the entire office building was ready for occupancy in April, 1915. All work is under the direction of James McMartin, chief engineer of the Delaware & Hudson, with Otis F. Rowland, assistant engineer in immediate charge.

PRESENT WELFARE WORK OF FRENCH RAILROADS

By Walter S. Hiatt*

Despite the enormous financial losses sustained by French railroads because of the war and the consequent reduction in commercial tonnage and passenger traffic, these railroads have continued their usual welfare work in the interest of their employees and have, indeed, increased it surprisingly in certain directions.

This fact is indicated in a recently issued report of the Paris-Lyons-Mediterranean Railway. In view of the facts that the railroad is under the control of the war department and that it has suffered tremendous war losses on every hand, some of these expenses might have been cut down by the board of directors. The railroad, however, seems to have shouldered all it could and to have helped freely in the united effort of the French people to keep going in war time. Even new homes for employees in conformance with plans made before the war, have been completed. The report does not call any particular attention to the work, but barely outlines the facts. The board of directors voted the usual sum to provide pensions for its 80,000 employees—a little over $5,000,000 this year. The sum set aside for various kinds of welfare work totaled over $6,500,000.

During the first few months of the war more than $280,000 of the total was spent to aid the 12,000 younger employees who went to the front as soldiers, these men having served less than six months on the railroad and being subject to enrollment as soldiers and not as railroad employees engaged in military transportation. These soldiers were paid one-half their salaries and, when they had families to support, the railroad continued half of their salaries, and when possible gave the women employment as ticket sellers or clerks. In addition, such employees received their usual end of the year bonus, and their time as soldiers was counted as company service time towards promotions and participation in pensions.

The welfare work for the year 1914 is subdivided as follows:

Allowances to large families	$450,000
Allowances to co-operative societies	30,000
Gifts to the treasury of pensions	4,450,000
Special pensions	593,000
To schools, orphans, apprentice shops, sanitariums	88,000
Salaries and half salaries to the sick	471,000
Medical supplies and care of sick	175,000
Hot drinks and mineral waters to employees	15,000
Interest on free loans	1,500

Among the interesting details of the general welfare work of the road, which is typical of all the French railroads, is its care of orphans of employees. In addition to the above sums, the company found homes for 188 of its own orphans and made a contribution to the national organization which cares for the 870 orphans of the railroads of France, this number having been grievously increased, because of the many deaths of soldiers at the front during the past few months. The company also provided for the schooling of 444 boys and girls of employees.

Further, this company provided homes to the number of 1,388 in the districts on its lines where rent is high or else in the country where modern houses are not available.

Note is also made of the satisfactory results of the system of loans without interest to employees, begun in 1899. During the past year $86,000 was loaned to 2,887 employees who found themselves in urgent need of ready money, and in 1913 $100,000 was loaned to 3,294 employees. Since 1899 the company has loaned $1,100,000 to 32,959 employees, and during that period of 15 years has lost but $1,300 through failures to refund.

A final paragraph of the report states that the company gave employment to some of the Belgian railroad men driven out of their own country. It also started an employment agency for the refugees from the invaded regions of northern France and found work on its own lines for 1,200 persons. At the same time it granted reduced fares to those moving to new homes.

*Our special European correspondent.

The American Society for Testing Materials

An Abstract of the Proceedings of the Eighteenth Annual Meeting; Some of the More Important Specifications

As mentioned in last week's issue the eighteenth annual convention of the American Society for Testing Materials was held at the Hotel Traymore, Atlantic City, June 22-26, President A. W. Gibbs, chief mechanical engineer of the Pennsylvania Railroad, presiding. The address of the president and a paper by C. D. Young, describing the test department of the Pennsylvania Railroad, were published in last week's issue. The following officers were elected for the coming year: President, Mansfield Merriman; vice-president, W. H. Bixby; members of the executive committee, J. H. Gibboney, W. K. Hatt, J. A. Mathews and Edward Orton, Jr.

Proposed standard specifications for iron and steel chain were referred to letter ballot for adoption. These specifications differ slightly from the specifications of the Master Car Builders' Association, but members of that association who are members of the committee of the American Society for Testing Materials feel confident that the M. C. B. Association will revise its specifications to conform to those proposed by the committee. Revised standard specifications for malleable iron castings were also referred to letter ballot of the society for adoption as standard.

A paper on the Fusibility of Coal Ash was presented by A. C. Fieldner, A. E. Hall and A. L. Feild. A study was made of the principal causes for variations in the softening temperatures of coal ash as indicated by the deformation of Seger cones molded from the pulverized ash. Comparative tests were made on a series of 18 types of coal ash in six different furnaces which are in more or less common use for determining the degree of fusibility of silicate mixtures.

BATTERY ZINCS: SOME CAUSES OF DEFECTIVE SERVICE

The following is taken from a paper on this subject by Robert Job and F. F. White:

The serviceability of the zinc element of a gravity cell, such as is commonly used in railway service, is generally considered to depend mainly upon its composition, and it is specified usually that the percentage of iron shall be a minimum, say, not exceeding 0.10 per cent, lead not to exceed 0.50 per cent and not less than 2 per cent of mercury.

A recent investigation has been of interest in proving the radical influence which the details of the method of manufacture exert upon the practical value of the metal in service. In the course of routine tests, two shipments of zinc were received and on analysis were found to have the following composition:

	Shipment A.	Shipment B.
Mercury, per cent	2.49	2.26
Lead, per cent	0.17	0.17
Iron, per cent	0.15	0.10

These results were within the specification limits, or nearly so, and the shipments were approved. It developed in service, however, that shipment A was far superior to shipment B. The zincs in the latter lot, after comparatively short service, became coated with copper which protected the zinc from the action of the electrolyte, and in consequence the cell became "dead" when but little of the zinc had been dissolved.

In view of the satisfactory average analysis of the zincs, it was felt that the difference in service was probably due to characteristics other than composition, and an investigation was made of each of the components of the cell. The copper sulphate contained 0.75 per cent of iron. This amount was the maximum permitted by the specifications, but the same copper sulphate gave good results when used with zincs of shipment A. It was decided then that the difference in the zincs was probably physical, and in order to develop possible variations in structure, transverse sections were taken from several samples in each shipment, and were polished and etched lightly.

The etchings and subsequent microscopic examination showed marked difference. The good samples were fine grained and of uniform structure, clear to the outside surface of the zincs, whereas the others were coarse grained, indicating pouring into molds at a high temperature. Also, a distinct band of bright metal was seen around the contour of the defective sections. The natural inference was that the outside metal contained little mercury, and in order to determine this we took borings from each section around the surface to a depth of 1/16 in., and found the mercury content for a specimen representing shipment A, to be 2.49 per cent, and that for one representing shipment B, 0.64 per cent. These results showed the condition clearly and indicated the main cause of failure of shipment B.

It is a well-known fact that mercury volatilizes to a considerable extent when added to molten zinc, unless suitable precautions are taken; consequently it is necessary not only to avoid overheating the bath of metal, but also to keep the molds cooled. Evidently in the case of shipment B this latter practice had not been followed, and hence the proportion of mercury upon the surface of the zincs was extremely low and evidently insufficient to protect the zincs from local action.

The foundry practice necessary to produce well-mixed, sound and serviceable battery zincs is not difficult, but it is particularly essential that overheating of the metal be avoided, either in the melting pot or in the mold, and that after addition of the mercury the bath be kept carefully stirred in order to avoid segregation.

Acknowledgment is made of the assistance of H. W. Lewis, signal engineer of the Lehigh Valley, in noting the characteristics of the shipments in service, and for help rendered in carrying out the investigation.

PROPOSED STANDARD SPECIFICATIONS FOR QUENCHED HIGH-CARBON STEEL SPLICE BARS

1. The steel shall be made by the open-hearth process.

2. The splice bars shall be punched, slotted and, in the case of special designs, shaped at a temperature not less than 750 deg. C., and subsequently quenched.

3. The steel shall conform to the following requirements as to chemical composition:

Carbon	not over 0.60 per cent
Manganese	" " 0.80 " "
Phosphorus	" " 0.04 " "

4. An analysis to determine the percentages of carbon, manganese, phosphorus and sulphur shall be made by the manufacturer from a test ingot taken during the pouring of each melt, a copy of which shall be given to the purchaser or his representative. This analysis shall conform to the requirements specified in Section 3. Drillings for analysis shall be taken not less than ⅛ in. beneath the surface of the test ingot.

5. Analyses may be made by the purchaser from finished splice bars representing each melt, in which case an excess of 25 per cent above the requirement as to phosphorus specified in Section 3 shall be allowed.

6. The splice bars shall conform to the following minimum requirements as to tensile properties:

Tensile strength, lb. per sq. in.	100,000
Yield point, " "	65,000
Elongation in 2 in., per cent	10

7. The bend test specimen specified in Section 8 shall bend cold through 90 deg. around a pin, the diameter of which is equal to three times the thickness of the specimen, without cracking on the outside of the bent portion.

8. Tension and bend test specimens shall be taken from the finished bars. Tension test specimens shall be of the form and dimensions shown in the illustration. Bend test specimens may

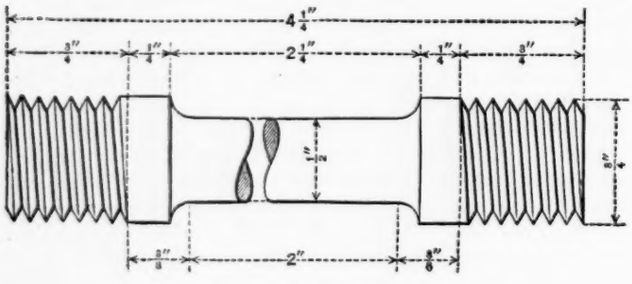
be ½ in. square in section, or rectangular in section with two parallel faces as rolled, with corners rounded to a radius not over 1/16 in.

9. If preferred by the manufacturer and approved by the purchaser, the following bend test may be substituted for that described in Section 7: A piece of the finished bar shall bend cold through 45 deg. around a pin the diameter of which is equal to three times the greatest thickness of the section, without cracking on the outside of the bent portion.

10. (*a*) One tension and one bend test shall be made from each melt.

(*b*) If any test specimen shows defective machining or develops flaws, it may be discarded and another specimen substituted.

(*c*) If the percentage of elongation of any tension test specimen is less than that specified in Section 6 and any part of the



Tension Test Specimen

fracture is more than ¾ in. from the center of the gage length, as indicated by scribe scratches marked on the specimen before testing, a retest shall be allowed.

11. If the results of the physical tests of any test lot do not conform to the requirements specified, the manufacturer may re-treat such lot one or more times and retests shall be made as specified in Section 10.

12. The splice bars shall be smoothly rolled, true to templet, and shall accurately fit the rails for which they are intended. The bars shall be sheared to length, and the punching and notching shall conform to the dimensions specified by the purchaser. A variation of 1/32 in. from the specified size of holes, of 1/16 in. from the specified location of holes, and of ⅛ in. from the specified length of splice bar, will be permitted. Any variation from a straight line in a vertical plane shall be such as will make the bars high in the center. The maximum camber in either plane shall not exceed 1/16 in. in 24 in.

13. The finished splice bars shall be free from injurious defects and shall have a workmanlike finish.

14. The name or brand of the manufacturer and the year of manufacture shall be rolled in raised letters and figures on the side of the rolled bars, and a portion of this marking shall appear on each finished splice bar.

15. The inspector representing the purchaser shall have free entry, at all times while work on the contract of the purchaser is being performed, to all parts of the manufacturer's works which concern the manufacture of the splice bars ordered. The manufacturer shall afford the inspector, free of cost, all reasonable facilities to satisfy him that the splice bars are being furnished in accordance with these specifications. All tests (except check analyses) and inspection shall be made at the place of manufacture prior to shipment, unless otherwise specified, and shall be so conducted as not to interfere unnecessarily with the operation of the works.

16. (*a*) Unless otherwise specified, any rejection based on tests made in accordance with Section 5 shall be reported within five working days from the receipt of samples.

(*b*) Splice bars which show injurious defects subsequent to their acceptance at the manufacturer's works will be rejected, and the manufacturer shall be notified.

17. Samples tested in accordance with Section 5, which represent rejected splice bars, shall be preserved for two weeks from the date of the test report. In case of dissatisfaction with the results of the tests, the manufacturer may make claim for a rehearing within that time.

The report was referred to letter ballot.

PROPOSED STANDARD SPECIFICATION FOR QUENCHED CARBON STEEL TRACK BOLTS

1. (*a*) The steel for the bolts shall be made by the open-hearth process.

(*b*) The steel for the nuts shall be made by the Bessemer or open-hearth process.

2. The bolts shall enter the quenching medium at a temperature not less than 70 deg. C. The threads may be rolled either hot or cold.

3. The steel for the bolts shall conform to the following requirements as to chemical composition:

Carbon	not under 0.30 per cent
Phosphorus	not over 0.04 " "

4. An analysis to determine the percentages of carbon, manganese, phosphorus and sulphur shall be made by the manufacturer from a test ingot taken during the pouring of each melt, a copy of which shall be given to the purchaser or his representative. This analysis shall conform to the requirements specified in Section 3. Drillings for analysis shall be taken not less than ⅛ in. beneath the surface of the test ingot.

5. Analyses may be made by the purchaser from finished bolts representing each melt, in which case an excess of 25 per cent above the requirement as to phosphorus specified in Section 3 shall be allowed.

6. (*a*) The bolts shall conform to the following minimum requirements as to tensile properties:

Tensile strength, lb. per sq. in.	100,000
Yield point, " "	70,000
Elongation in 2 in., per cent	12

(*b*) Nuts shall be capable of developing the strength of the finished bolt up to its yield point.

7. Full-size bolts shall bend cold through 45 deg. around a pin the diameter of which is equal to the diameter of the bolt, without cracking on the outside of the bent portion.

8. Tension test specimens shall be taken from the finished bolts and shall be of the form and dimensions shown in Fig. 1 (for carbon steel splice bars).

9. (*a*) One tension and one bend test shall be made from each lot of 50 kegs or fraction thereof.

(*b*) If any test specimen shows defective machining or develops flaws, it may be discarded and another specimen substituted.

(*c*) If the percentage of elongation of any tension test specimen is less than that specified in Section 6 (*a*) and any part of the fracture is more than ¾ in. from the center of the gage length, as indicated by scribe scratches marked on the specimen before testing, or if the bend test specimen breaks in the threaded portion, a retest shall be allowed.

10. If the results of the physical tests of any test lot do not conform to the requirements specified, two additional tension and two additional bend tests shall be made from such lot, all of which shall conform to the requirements specified.

11. The bolts and nuts shall conform to the dimensions specified by the purchaser. The bolts shall be neatly formed, free from fins or nickings. The head shall be concentric with, and firmly joined to, the bottom of the bolt, with the under side of the head at right angles to the body of the bolt. The threads shall be sharp and true to gage and of the pattern specified by the purchaser. The nuts shall fit the bolts tightly so as to require a wrench not more than 10 in. in length to turn them down without distorting the threads or twisting the bolts. The nuts shall be screwed on before shipping, a sufficient number of turns to hold them on to destination. A variation of 1/32 in. under and 1/64 in. over the specified diameter of the body of the bolt will be permitted. The diameter of the rolled thread shall not exceed the diameter of the body of the bolt more than 1/16 in. for ⅞-in. bolts and 3/32 in. for 1-in. bolts. A variation in the

dimensions of the elliptical shoulders under the head of the bolt of 1/32 in. from the specified size will be permitted. A taper of the shoulder of 1/32 in. will be permitted.

12. The finished bolts and nuts shall be free from injurious defects and shall have a workmanlike finish.

13. A letter or brand indicating the manufacturer shall be pressed on the head of the bolt when it is formed.

14. The inspector representing the purchaser shall have free entry, at all times while work on the contract of the purchaser is being performed, to all parts of the manufacturer's works which concern the manufacture of the bolts and nuts ordered. The manufacturer shall afford the inspector, free of cost, all reasonable facilities to satisfy him that the bolts and nuts are being furnished in accordance with these specifications. All tests (except check analyses) and inspection shall be made at the place of manufacture prior to shipment, unless otherwise specified, and shall be so conducted as to not interfere unnecessarily with the operation of the works.

15. (*a*) Unless otherwise specified, any rejection based on tests made in accordance with Section 5 shall be reported within five working days from the receipt of samples.

(*b*) Bolts and nuts which show injurious defects subsequent to their acceptance at the manufacturer's works will be rejected, and the manufacturer shall be notified.

16. Samples tested in accordance with Section 5, which represent rejected bolts and nuts, shall be preserved for two weeks from the date of the test report. In case of dissatisfaction with the results of the tests, the manufacturer may make claim for a rehearing within that time.

This report was referred to letter ballot.

PROPOSED STANDARD SPECIFICATIONS FOR QUENCHED ALLOY-STEEL TRACK BOLTS

1. (*a*) The steel for the bolts shall be made by the open-hearth or electric process.

(*b*) The steel for the nuts shall be made by the Bessemer or open-hearth process.

2. The bolts shall enter the quenching medium at a temperature of not less than 790 deg. C. The threads may be rolled either hot or cold.

3. The steel for the bolts shall conform to the following requirement as to chemical composition:

Phosphorus.....not over 0.035 per cent

4. An analysis to determine the percentages of carbon, manganese, phosphorus and sulphur and any other elements used to obtain the physical properties specified in Sections 6 and 7 shall be made by the manufacturer from a test ingot taken during the pouring of each melt, a copy of which shall be given to the purchaser or his representative. This analysis shall conform to the requirement specified in Section 3. Drillings for analysis shall be taken not less than ⅛ in. beneath the surface of the test ingot.

5. Analyses may be made by the purchaser from finished bolts representing each melt, in which case an excess of 25 per cent above the requirement as to phosphorus specified in Section 3 shall be allowed.

6. (*a*) The bolts shall conform to the following minimum requirements as to tensile properties:

Tensile strength, lb. per sq. in.	110,000
Yield point, lb. per sq. in.	85,000
Elongation in 2 in., per cent	12

The rest of the five specifications are the same as for Heat-Treated Carbon Steel Track Bolts.

SPECIFICATIONS FOR SPRINGS, ALLOY STEEL FORGINGS AND AXLES

The Committee on Steel submitted proposed tentative specifications for silico-manganese steel bars for automobile and railway springs, for chrome-vanadium steel bars for automobile and railway springs, for helical and elliptical railway springs, for alloy steel forgings and for quenched-and-tempered alloy steel axles and other car and locomotive forgings. The latter are as follows:

1. (*a*) These specifications cover the various classes of alloy-steel forgings now commonly used in locomotive and car construction.

(*b*) The purposes for which these classes are frequently used are as follows:

Class K, for forgings for main and side rods, straps, piston rods, and all other forgings which are to be machined with milling cutters or complicated forming tools;

Class L, for forgings for driving and trailing-truck axles, crank pins, and other parts not requiring the use of milling cutters or complicated forming tools.

2. The steel may be made by the open-hearth or any other process approved by the purchaser.

3. A sufficient discard shall be made from each ingot to secure freedom from injurious piping and undue segregation.

4. For test purposes, a prolongation shall be left on each forging, unless otherwise specified by the purchaser.

5. (*a*) Unless otherwise specified by the purchaser, all forgings over 7 in. in diameter shall be bored, and all axles, shafts and similar forgings shall be rough-turned all over. The boring and rough-turning shall be done before quenching.

(*b*) If boring is specified, the diameter of the hole shall be at least 20 per cent of the maximum outside diameter or thickness of the forging, exclusive of collars and flanges.

6. For quenching and tempering, the forgings shall be allowed to become cold after forging. They shall then be uniformly reheated to the proper temperature to refine the grain (a group thus reheated being known as a "quenching charge"), and quenched in some medium under substantially uniform conditions for each quenching charge. Finally, they shall be uniformly reheated to the proper temperature for tempering or "drawing back" (a group thus reheated being known as a "tempering charge"), and allowed to cool uniformly.

7. The steel shall conform to the following requirements as to chemical composition:

	Acid.	Basic.
Phosphorus	not over 0.05	not over 0.04 per cent
Sulphur	not over 0.05	not over 0.05 per cent

The composition of alloy steel, other than phosphorus and sulphur, shall be agreed upon by the manufacturer and the purchaser.

8. An analysis to determine the percentages of carbon and the elements specified in Section 7 shall be made by the manufacturer from a test ingot taken during the pouring of each melt, a copy of which shall be given to the purchaser or his representative. This analysis shall conform to the requirements specified in Section 7.

9. Analyses may be made by the purchaser from a forging representing each melt, which shall conform to the requirements specified in Section 7. Drillings for analysis may be taken from the forging or from a full-size prolongation of the same, at any point midway between the center and surface of solid forgings, and at any point midway between the inner and outer surfaces of the wall of bored forgings; or turnings may be taken from a test specimen.

In addition to the complete analysis, a phosphorus determination may be made by the purchaser from each broken tension test specimen, and this determination shall conform to the requirement for phosphorus specified in Section 7.

10. (*a*) The forgings shall conform to the requirements as to tensile properties specified in Table I.

(*b*) The classification by size of the forging shall be determined by the specified diameter or thickness which governs the size of the prolongation from which the test specimen is taken.

(*c*) The elastic limit shall be determined by means of an extensometer.

(*d*) Tests of forgings shall be made only after final treatment.

11. If specified by the purchaser, bend tests shall be made as follows:

(*a*) For the first and second classes by size, the test specimen shall bend cold through 180 deg. around a 1-in. flat man-

drel having a rounded edge of ½-in. radius, without cracking on the outside of the bent portion.

(*b*) For the third and fourth classes by size, the test specimen shall bend cold through 180 deg. around a 1½-in. flat mandrel having a rounded edge of ¾-in. radius, without cracking on the outside of the bent portion.

12. Unless otherwise specified by the purchaser, all forgings shall be subjected to an impact proof test. The details of this test shall be agreed upon by the manufacturer and the purchaser.

13. (*a*) Tension and bend test specimens shall be taken from a full-size prolongation of any forging. For forgings with large ends or collars the prolongation may be of the same cross-section as that of the forging back of the large end or collar. Specimens may be taken from the forging itself with a hollow drill, if approved by the purchaser.

(*b*) The axis of the specimen shall be located at any point midway between the center and surface of solid forgings, and at any point midway between the inner and outer surfaces of the wall of bored forgings, and shall be parallel to the axis of the forging in the direction in which the metal is most drawn out.

(*c*) Tension test specimens shall be of the form and dimensions shown in the illustration.

(*d*) Bend test specimens shall be ½ in. square in section with corners rounded to a radius not over 1/16 in., and need not exceed 6 in. in length.

14. (*a*) One tension and, if specified by the purchaser, one bend test shall be made from each tempering charge. If more than one quenching charge is represented in a tempering charge, one tension and, if specified, one bend test shall be made from each quenching charge. If more than one melt is represented in a quenching charge, one tension and, if specified, one bend test shall be made from each melt.

(*b*) If more than one class of forgings by size is represented in any lot, one tension and, if specified, one bend test from a forging of each class by size shall be made as specified in Sections 10, 11 and 13.

(*c*) If any test specimen shows defective machining or develops flaws, it may be discarded and another specimen substituted.

(*d*) If the percentage of elongation of any tension test specimen is less than that specified in Section 10 (*a*) and any part of the fracture is more than ¾ in. from the center of the gage length, as indicated by scribe scratches marked on the specimen before testing, a retest shall be allowed.

15. (*a*) If the results of the physical tests of any test lot do not conform to the requirements specified, the manufacturer may retemper or requench and temper such lot, but not more than three additional times unless authorized by the purchaser, and retests shall be made as specified in Section 14.

(*b*) If the fracture of any tension test specimen shows over 15 per cent crystalline, a second test shall be made. If the fracture of the second specimen shows over 15 per cent crystalline, the forgings represented by such specimen shall be retempered or requenched and tempered.

16. The forgings shall conform to the sizes and shapes specified by the purchaser. Axles, shafts and similar forgings, unless otherwise specified, shall be rough-turned all over with an allowance of ⅛ in. on the surface for finishing. In centering, 60-deg. centers with clearance drilled for points shall be used.

17. The forgings shall be free from injurious defects and shall have a workmanlike finish.

18. Identification marks shall be legibly stamped on each forging and on each test specimen. The purchaser shall indicate the location of such identification marks.

19. (*a*) The inspector representing the purchaser shall have free entry, at all times while work on the contract of the purchaser is being performed, to all parts of the manufacturer's works which concern the manufacture of the forgings ordered. The manufacturer shall afford the inspector, free of cost, all reasonable facilities to satisfy him that the forgings are being furnished in accordance with these specifications. Tests and inspection at the place of manufacture shall be made prior to shipment.

(*b*) The purchaser may make the tests to govern the acceptance or rejection of the forgings in his own laboratory or elsewhere. Such tests, however, shall be made at the expense of the purchaser.

(*c*) Tests and inspection shall be so conducted as not to interfere unnecessarily with the operation of the works.

20. (*a*) Unless otherwise specified, any rejection based on tests made in accordance with Section 19 (*b*) shall be reported within five working days from the receipt of samples.

(*b*) Forgings which show injurious defects while being finished by the purchaser will be rejected, and the manufacturer shall be notified.

21. Samples tested in accordance with Section 19 (*b*), which represent rejected forgings, shall be preserved for two weeks from the date of the test report. In case of dissatisfaction with the results of the tests, the manufacturer may make claim for a rehearing within that time.

TABLE I—TENSILE PROPERTIES (CLASSES K AND L)

For Forgings whose Maximum Outside Diameter or Thickness is not over 10 in. when Solid, and not over 20 in. when Bored

Class	Size	Tensile Strength, lb. per sq. in.	Elastic Limit, min., lb. per sq. in.	Elongation in 2 in., min., per cent	Reduction of Area, min., per cent
K Alloy Steel, Quenched and Tempered	Up to 2 in. in outside diameter or thickness, 1-in. max. wall	95,000—115,000	70,000	20	50
	Over 2 to 4 in. in outside diameter or thickness, 2-in. max. wall	90,000—110,000	65,000	20	50
	Over 4 to 7 in. in outside diameter or thickness, 3½-in. max. wall	90,000—110,000	65,000	20	50
	Over 7 to 10 in. in outside diameter or thickness, 5-in. max. wall	90,000—110,000	65,000	20	50
	Outside diameter or thickness not over 20 in., 5 to 8-in. wall	85,000—105,000	60,000	20	50
L Alloy Steel, Quenched and Tempered	Up to 2 in. in outside diameter or thickness, 1-in. max. wall	105,000—125,000	80,000	20	50
	Over 2 to 4 in. in outside diameter or thickness, 2-in. max. wall	100,000—120,000	75,000	20	50
	Over 4 to 7 in. in outside diameter or thickness, 3½-in. max. wall	100,000—120,000	75,000	20	50
	Over 7 to 10 in. in outside diameter or thickness, 5-in. max. wall	100,000—120,000	75,000	18	45
	Outside diameter or thickness not over 20 in., 5 to 8-in. wall	95,000—115,000	70,000	18	45

FINISHING TEMPERATURES OF RAILS

In a recent paper by G. K. Burgess, J. J. Crowe, H. S. Rawdon and R. G. Waltenburg, which was issued by the Bureau of Standards under the title "Observations on Finishing Temperatures and Properties of Rails", (*Railway Age Gazette*, June 26, 1914) the standard specifications for steel rails adopted by the American Society for Testing Materials are criticized, in a general condemnation of the use of shrinkage allowance as the basis of temperature determination.

2. In that the shrinkage permitted is too great.

The committee took these criticisms under consideration, and presents a report.

Shrinkage Allowance vs. Pyrometer Control

Theoretically the determination of the finishing temperature of a bar of steel, because of the sensitiveness of the measuring apparatus, should be much more exact than measuring the variation in the change of length of a bar in cooling. There are, however, two reasons why the cruder means is preferable.

1. It is much easier to enforce. The mill must set the saws at such a distance apart in the case of gang saws, or at such distance from the stop in the case of a single saw, that when rails

are cold they will be within the close tolerances for length prescribed by the specifications. The penalty for not observing this is the milling of every rail to length, and the penalty is so severe in a modern rail mill that there is no question that the proper adjustment of the hot length will be provided. The measurement of temperatures of rails by pyrometer is a much more complicated proposition. Carrying the identity of each hot rail as to its observed temperature through the mill and out to the finishing shed where it can be rejected where necessary, would be a difficult and expensive procedure.

2. The pyrometer measures the temperature at the particular portion of the bar that is under observation. For a simple section this does not vary greatly, but in a complex section, like a T rail, there is a wide variation in the temperature of the various parts.

The Amount of Shrinkage

The authors of the paper have taken the maximum shrinkage allowed in the specifications of the society, and by dividing by the coefficient of shrinkage established by their experiments, have arrived at a temperature which they claim could be used in rolling rails, and yet keep within the requirements of the specifications. Such a method of arriving at rolling temperatures is not admissible in the case of unbalanced sections. The shrinkage allowance necessary for rails is a function, not only of the average temperature, but also of the section. The flanges of a thin-base section cool much more rapidly than the other parts of the section, and in cooling first, they become more rigid than the remainder of the section. When cut by the saws the cooler base and hotter head are of the same length, but as the head has a greater range to cool through, its shrinkage would be greater and cold length less than the base. This is corrected by the cambering rolls, which stretch the head to such length as will compensate for its greater shrinkage.

The shrinkage allowance necessary for any rail is not the shrinkage allowance based on the average temperature of the rail, nor the temperature of the head or base, such as observed in the Bureau of Standards' experiments; but the shrinkage allowance in sawing, which is necessary for any rail, is the amount of shrinkage of the portion which cools and becomes rigid first.

In view of the importance of the subject, it seems very desirable to secure some data as to the effect of the variation in the finishing temperature on the quality of the rail. While there is a large amount of literature bearing on the subject, actual dependable data regarding the quality of the rails are very scarce. M. H. Wickhorst reported on a series of tests made on Bessemer rails, the finishing temperatures of which measured on the heads varied from 940 to 1,030 deg. C., and more recently he reported on a similar series of tests made on open-hearth rails. The rails were subjected to drop tests, bend tests, tension tests, transverse tests of base, and the structure was examined under the microscope.

As a result of the tests on Bessemer steel rails, Mr. Wickhorts reported "that the ductility and deflection in the drop test were influenced little, if any, by the temperature. The number of blows that it took to break the rails in the drop test was uninfluenced by the temperature of rolling. The yield point and tensile strength in the tension tests were influenced little, if any. The elongation in the tension test decreased some as the temperature increased. The influence of temperature showed most prominently in the tension test, in the reduction of area, which decreased as the temperature of rolling increased. The size of the grain, as shown by the microscope, increased as the temperature increased."

His conclusions on the open-hearth series, which were rolled at temperatures between 695 and 850 deg. C., were as follows:

"It may be said that the results in the drop tests, slow bending tests and transverse tests of the base, were about the same for the different finishing temperatures, varied by holding the rail bar between rolls before final finishing. In the tensile tests the results were also about the same, except that the lower finishing temperatures showed a little greater elongation and reduction of area. The lower finishing temperatures also showed a somewhat finer grain structure."

In all of the information as to actual tests which the committee was able to obtain, there is lacking anything which points to such decided differences in the quality of rails rolled at varying temperatures, as theoretical considerations have led some to expect. The differences are so slight that it seems hardly justifiable to go to any great expense in determining finishing temperatures any more accurately than is possible with the shrinkage clause, which on account of its easy application is by far the most convenient means of checking the finishing temperature.

CHANGES IN DUES

At the opening of the fifth session the secretary presented a report from the joint executive committee composed of the incoming and outgoing officers, recommending that the dues of members be increased from $10 to $15 per year; those of juniors from $5 to $7.50 and those of members in perpetuity from $200 to $300. It was voted to accept the report and refer the suggestion to letter ballot.

MICROGRAPHIC DETERMINATION OF DECARBURIZATION OF HEAT-TREATED STEELS

The report called attention to the possibility of detecting the amount and depth of decarburization of the surface and stated, in conclusion, that surface decarburization frequently exists in heat-treated steel parts, due either to the mill practice or to the heat treatment itself. From whatever cause, it should be investigated by the metallurgist and its extent ascertained. The microscope is undoubtedly the most efficient means of accomplishing this purpose in hypo-eutectoid steels. When the exact cause and extent have been determined, means may be provided for correcting it—at least to a certain extent. In the grinding operation, however, there sometimes lies the opportunity of entirely removing its deleterious effects by a judicious determination of the grinding limits, and in this the metallurgist should play a more conspicuous part than he has in the past.

RELATIONS BETWEEN MAXIMUM STRENGTH AND HARDNESS

This paper showed that there is a close relationship between the hardness of a steel and the maximum strength; and that this relationship exists whether the same maximum strength be obtained from different steels by a difference in the heat-treatment to which they are subjected or whether the hardness is different because of difference in the steels themselves. In this it appears that there is no relationship between the chemical composition and the hardness, but only between the hardness and the maximum strength.

Discussion.—In the brief discussion that followed attention was called to the desirability that there should be found to be some relationship between the hardness and the limit of elasticity as this is really the quality with which the designer is most concerned. It is exceedingly desirable that some quick method should be found for determining the elastic limit of materials and that without mutilation. It was shown that this might be done for any specific steel treated in a definite manner, where the limit of elasticity was known from other means and that the hardness test might thus be made to indicate the elastic limit of another piece similarly treated.

SOME NEGLECTED PHENOMENA IN THE HEAT-TREATMENT OF STEEL

The two points to which attention was particularly called in this paper were that, in the heating of a piece of steel to a point above its temperature of saturation, there was a pause in the rate of heating as the temperature of the piece was passing through the saturation temperature; and further that with constant furnace temperatures, the higher temperatures were reached by the pieces in a shorter time than the lower ones. For example, a temperature of 1,200 deg. F. was reached in a shorter time than one of 1,000 deg. and one of 1,600 deg. in a shorter time still, while to reach 1,400 deg. took the longest of all. The

explanation of this is that the absorption of heat varies as the difference between the fourth powers of the temperatures of the furnace and the piece being heated and that this difference increases as the furnace temperature increases, so that the absorption of heat is correspondingly more rapid. The seeming exception in the case of the rise to 1,400 deg. is explained on the ground of the phenomenon of lag in passing through the temperature of saturation, which is at about 1,350 deg., and therefore close to 1,400, where the difference of the fourth power is small, resulting in a slow increase of temperature at that point.

Discussion.—The discussion called attention to the practice of specifications calling for a slow heating and a rapid cooling as though the two practices were in opposition to each other, but it was explained that, in heating a piece, it was put under tension and that if the work were to be done rapidly, cracks would be developed, while in the case of cooling the surfaces were put in compression and there was not the same danger.

INTERNAL STRESSES DEVELOPED BY DIFFERENT QUENCHING MEDIUMS, AND THEIR EFFECTS

It was shown that the quenching power of a liquid depends largely on the latent heat of vaporization, and refutes the views commonly held that it depends upon the initial temperature or the heat conductivity of the medium. The addition of salt to increase the quenching power of water is also proved fallacious, and the experiments of Le Chatelier that the conductivity for heat is no measure of the cooling power of a liquid are confirmed.

Mercury has a heat conductivity of over ten times that of water, but both of these able physicists demonstrate that it is decidedly weaker as a cooling medium. Le Chatelier considers that the specific heat of the cooling medium governs the cooling speed—and this is confirmed by Benedicts—providing the temperature of the body is low, but the latent heat of vaporization is the controlling factor when the temperature of the body is high. This theory is tenable considering the large amount of heat which can be carried off by a relatively small weight of vapor, and accounts for the efficiency of water as a quenching medium.

Water is the oldest known cooling medium for quenching steel. Subsequently, various animal and vegetable oils were employed, and many of the artisans using them are still under the belief that carbon is added to the steel by these liquids and the properties thereby improved. In this country mineral oil, because of its low cost, has almost entirely displaced the animal and vegetable oils, and for many years was used almost exclusively for quenching spring plates and large objects. Water, however, possesses manifest advantages of cheapness, cleanliness, freedom from odor, freedom from fire hazard, and above all, efficiency. It is true that a higher elastic limit, tensile strength and elastic ratio for a corresponding elongation and reduction of area, or a higher reduction of area and elongation for a corresponding elastic limit, can be obtained on a water-quenched steel than can be secured by the methods of oil quenching generally practiced. Opposing these manifest advantages is the danger from fractures as the result of the lag in the temperature of the steel.

The results of these experiments are as follows:

1. That the tensile properties of water-quenched steel are superior to those obtained by quenching in any other of the usual quenching mediums.

2. The internal stresses induced in a water-quenched object are of much greater magnitude than those developed by quenching in any other of the usual quenching mediums.

3. They confirm the laboratory experiments of Doctor Benedicts, that the efficiency of the quenching mediums is not dependent to a marked extent on the initial temperature of the cooling mediums.

4. With but few exceptions, which can no doubt be explained by some inequality in the steel, the induced internal stresses are affected by the initial temperature, except in the case of water.

5. Internal stresses induced by quenching in water are independent of the initial temperature.

6. The small difference between the temperature of the cooling mediums, before and after quenching, confirms Doctor Benedicts' explanation that large quantities of heat are carried off by the latent heat of vaporization.

7. Light oils have a greater quenching speed than heavy oils but not markedly so. A good tempering oil, however, should be free from tar and should not become thick from the precipitation of the burnt tar.

THE EFFECT OF FINER GRINDING UPON THE PHYSICAL PROPERTIES OF PORTLAND CEMENT

The following is from a paper on this subject by P. H. Bates. The question of the finer grinding and the addition of more SO_3 to Portland cement is frequently discussed, and the consensus of opinion seems to be that further investigation is needed. Ten commercial cements either had more SO_3 added to them, were ground finer, or were both ground finer and had more SO_3 added. From the four groups of ten cements each, the customary physical tests and small specimens were made. In addition cylinders of 1:1½:4½ concrete were made, and expansion bars of neat and 1:3 standard sand mortars. Some of the neat tension briquettes were also examined microscopically for relative amounts of hydration.

The results show that the time of set is affected somewhat by each of the above treatments, finer grinding tending to produce a quicker set, and the addition of more SO_3 a quicker initial but slower final set. The addition of SO_3 to the coarser-ground cements does not materially affect the strength; finer grinding produces considerable increase; while the addition of SO_3 to the finer-ground cements tends to produce results very slightly less than those obtained when they contain the normal amount. Expansion measurements show that the addition of SO_3 to the coarse cements produces a large increase in length of neat cements; to finer-ground cements the increase is not so great. Finer grinding alone does not materially affect the expansion due to hydration; the expansion of the mortar bars is not materially affected by the use of the different cements.

All conclusions made in this paper are deduced from results obtained from specimens tested at the end of 90 days. Specimens have been made to be tested at the end of six months, one year, and two later periods, and consequently the present conclusions may have to be materially modified.

STANDARD TESTS FOR LUBRICANTS

The committee has very carefully reconsidered its report of last year, which was referred back to it by the Society.

For the determination of viscosity, the committee reaffirms its recommendation of last year to the Society that the Saybolt Standard Universal Viscosimeter be the standard. The very careful investigation of Dr. C. W. Waidner of the Bureau of Standards, showing that the Saybolt instrument possesses as great accuracy as any other viscosimeter used for the determination of the viscosity of lubricants, confirms the previous opinion of the committee. The Saybolt viscosimeter is the instrument in practically universal use in the United States for the determination of the viscosity of lubricants, and possesses many other advantages covered by the committee's report of last year.

On the question of an alternate instrument for viscosity, the committee after very careful consideration has concluded that the adoption of an alternate instrument would entirely destroy the value of a standard instrument. The committee realizes, however, that there are many who for years past have used other instruments than the Saybolt and will probably continue to do so, and in order not to work undue hardship in these cases, the committee is now submitting, and will submit from time to time, conversion tables for converting readings on various viscosimeters into readings on the Saybolt Standard Universal Viscosimeter.

The committee recommends that the proposed Standard Tests for Lubricants covering viscosity, specific gravity, free acid, and cloud and pour tests, be referred to letter ballot of the society.

PAINTS USED IN HAVRE DE GRACE BRIDGE TESTS

The special sub-committee, to which was referred the motion made at the last annual meeting of the society charging it to renew its efforts to obtain such additional information as would enable the committee to describe the composition of the several paints of the Havre de Grace bridge tests more satisfactorily to the engineering profession, than could be interpreted from the committee's published analyses, and also to compile a brief résumé of the methods and conditions of the test, reports as follows:

Under date of November 20, 1914, a circular letter was sent to each of the manufacturers who furnished paints for the Havre de Grace bridge tests. This letter referred to the continued demand for fuller information as to the composition of the paints, and for an identification of the manufacturers' names with the paints tested. Two inquiries were made of each manufacturer, namely: (1) "Would you object to the committee reporting to the Society that panels and section Nos. —— were painted with paint furnished by you?"; and (2) "It is our plan to publish a brief description of your paint, such description to be based either upon the analysis which we have made, or upon information received from you. Would the following description of your paint be satisfactory?"

The letter also requested "that if the enclosed description is not satisfactory, please send one that is," adding that information of value to engineers was desired. Furthermore, there was enclosed to each manufacturer a blue-print "log," giving the record of the particular paint as applied, with a statement that copy of this had been sent originally upon completion of the painting of the bridge, and that such record was to be published by the committee.

The receipt of this letter was acknowledged by all but two of the contributing manufacturers. Of those who acknowledged the receipt of the letter, the manufacturers of nine paints were willing to have their names published in connection with the paints. The manufacturers of six paints were unwilling, and the manufacturers of two paints did not reply to this specific inquiry. The manufacturers of seven paints accepted the sub-committee's description without suggesting modifications. Ten suggested modifications.

The objections of the manufacturers of six paints to the publication of their names in connection with the paints makes it impossible for the sub-committee in good faith to publish any information relating thereto.

Satisfactory replies to the original circular letter asking for contributions to defray the expenses of the test having been received from a sufficient number of manufacturers to warrant the inauguration of the test, costs were figured on an area basis and a second circular letter sent to those who had agreed to enter the competition, the most important point involved being the following questions propounded, covering the composition and proportioning of the materials of each paint:

Pigment;
Volatile thinner;
Vehicle or liquid non-volatile matter, particular information being desired as to the following:
1. Saponifiable oils, that is, linseed, etc.;
2. Resinous matter, that is, resins and gums;
3. Bituminous matter, that is, asphaltum, pitch, etc.;
Mineral matter such as lead, manganese, lime, etc., other than that present as pigment.

Unfortunately these questions were regarded as too searching by many paint manufacturers on the ground that if answered they would disclose trade secrets and methods of manufacture, since the committee had stated that in formulating the above list of questions the information sought was not intended to include trade secrets or particular methods of treatment or manufacture of the constituents of the paints.

In view of the attitude of the manufacturers, and to avoid the complete jeopardizing of the proposed tests, the above questions were specifically withdrawn and only such information as the manufacturers were willing to submit was asked for. This, coupled with that to be derived from the duplicate analyses of each paint by the committee, comprised all the data accumulated whereon to base descriptions of the paints such as are desired by the large engineering membership of the society.

It must be understood that the committee fully recognized, as soon as the manufacturers refused the fullest information regarding their paint products, that a considerable part of the anticipated value of these tests would not be realized. Appreciating as time went on during the annual inspections, that the action of certain paints might be more intelligently interpreted with fuller detailed information not in the possession of the committee and not to be derived from a study of the most complete analyses but probably within the knowledge of the manufacturers, the unsatisfactory conditions imposed through the manufacturers' refusal to answer the original questions became so apparent that informal attempts were made from time to time to sound the manufacturers regarding the possibility of their meeting the committee's wishes. But with the development of the tests, it became more and more apparent that such information as desired by the committee could only have been obtained as originally proposed at the time of inauguration of the tests.

The test logs of the several paints give detailed information regarding the conduct of the tests which, as originally stated, was aimed to be "eminently fair to each competitor and to the paints themselves." The annual inspections were carefully carried out, all ratings being with the same scale, and detailed examination of yearly reports will demonstrate the surprising concordance of these with conditions likely to exist.

No attempt has been made in the reports on the Havre de Grace bridge tests to give full information as to the prices of the paints used, although it is recognized that engineers must consider price in figuring the cost of protection against rust.

SPECIFICATIONS FOR YELLOW-PINE BRIDGE AND TRESTLE TIMBERS

[These proposed revised standard specifications are to be applied to solid members and not to composite members.]

General Requirements:

1. Except as noted, all timber shall be cut from sound trees and sawed standard size; close-grained and solid; free from defects such as injurious ring shakes and crooked grain; unsound knots; knots in groups; decay; large pitch pockets, or other defects that will materially impair its strength.

2. (*a*) Dense southern yellow pine shall show on either end an average of at least six annual rings per inch and at least one-third summer wood, or else the greater number of the rings shall show at least one-third summer wood, all as measured over the third, fourth, and fifth inches on a radial line from the pith. Wide-ringed material excluded by this rule will be acceptable, provided that the amount of summer wood as above measured shall be at least one-half.

(*b*) The contrast in color between summer wood and spring wood shall be sharp and the summer wood shall be dark in color, except in pieces having considerably above the minimum requirement for summer wood.

(*c*) In cases where timbers do not contain the pith, and it is impossible to locate it with any degree of accuracy, the same inspection shall be made over 3 in. on an approximate radial line beginning at the edge nearest the pith in timbers over 3 in. in thickness and on the second inch (on the piece) nearest to the pith in timbers 3 in. or less in thickness.

(*d*) In dimension material containing the pith but not a 5-in. radial line, which is less than 2 in. by 8 in. in section or less than 8 in. in width, that does not show over 16 sq. in. on the cross-section, the inspection shall apply to the second inch from the pith. In larger material that does not show a 5-in. radial line the inspection shall apply to the 3 in. farthest from the pith.

(*e*) The radial line chosen shall be representative. In case of disagreement between purchaser and seller the average summer wood and number of rings shall be the average of the two radial lines chosen.

3. Sound southern yellow pine shall include pieces of southern pine without any ring or summer-wood requirement.

4. Rough timbers sawed to standard size, shall mean that they shall not be over ¼ in. scant from actual size specified. For in-

stance, a 12-in. by 12-in. timber shall measure not less than 11¾ in. by 11¾ in.

5. Standard dressing means that not more than ¼ in. shall be allowed for dressing each surface. For instance, a 12-in. by 12-in. timber shall, after dressing four sides, not measure less than 11½ in. by 11½ in.

II. Stringers

6. (*a*) Dense southern yellow pine shall show not less than 80 per cent of heart on each of the four sides, measured across the sides anywhere in the length of the piece; loose knots, or knots greater than 1½ in. in diameter, will not be permitted at points within 4 in. of the edges of the piece.

(*b*) Sound southern yellow pine shall be square-edged, except it may have 1 in. wane on one corner. Knots shall not exceed in their largest diameter one-fourth the width of the face of the stick in which they occur. Ring shakes extending not over one-eighth of the length of the piece are admissible.

III. Caps and Sills

7. (*a*) Dense southern yellow pine shall show 85 per cent of heart on each of the four sides, measured across the sides anywhere in the length of the piece, and shall be free from knots over 2½ in. in diameter. Knots shall not be in groups.

(*b*) Sound southern yellow pine shall be square-edged, except that it may have 1 in. wane on one corner, or ½ in. wane on two corners. Knots shall not exceed in their largest diameter one-fourth the width of the face of the stick in which they occur. Ring shakes extending not over one-eighth the length of the piece.

IV. Posts

8. (*a*) Dense southern yellow pine shall show not less than 75 per cent of heart, measured across the face anywhere on the length of the piece, and shall be free from knots over 2½ in. in diameter. Knots shall not be in groups.

(*b*) Sound southern yellow pine shall be square-edged, except it may have 1 in. wane on one corner, or ½ in. wane on two corners. Knots shall not exceed in their largest diameter one-fourth the width of the face of the stick in which they occur. Ring shakes shall not extend over one-eighth of the length of the piece.

V. Longitudinal Struts or Girts

9. (*a*) Dense southern yellow pine shall show one face all heart; the other face and two sides shall show not less than 85 per cent of heart, measured across the face or side anywhere in the piece, and shall be free from knots 1½ in. or over in diameter.

(*b*) Sound southern yellow pine shall be square-edged and sound, and shall be free from knots 1½ in. or over in diameter.

VI. Longitudinal X-Braces, Sash Braces and Sway Braces.

10. (*a*) Dense southern yellow pine shall show not less than 80 per cent of heart on two faces and four square edges, and shall be free from knots over 1½ in. in diameter.

(*b*) Sound southern yellow pine shall be square-edged and sound, and shall be free from knots 2½ in. or over in diameter.

PROPOSED TENTATIVE SPECIFICATIONS FOR SOUTHERN YELLOW-PINE PILES AND POLES TO BE CREOSOTED

1. The specifications as to strength shall agree with the requirements that will be finally adopted by the Society under the Standard Classification of Structural Timber stipulating the number of rings per inch or some substitute therefor. (Included in this section will also be a list of the allowable defects, etc.)

2. All piles or telegraph poles shall show 40 per cent sapwood in cross-section, or there shall be a ring of sapwood not less than 1 in. in thickness all around the heartwood.

3. (*a*) Piles and poles shall be cut from sound live trees, of straight grain and regular taper; without crooks exceeding one-fourth the diameter of the stick at the middle of the crook when peeled. They shall be free from rot, red heart, holes or rotten knots, shakes and felling checks.

(*b*) All piles and poles shall have the bark and inner skin carefully removed when the tree is felled; all limbs and knots trimmed flush and butts cut square.

4. The minimum diameter of piles after peeling shall be as follows:

Length	Butts, In.	Tops, In.
36 ft. and under	14	10
38 ft. and under 50 ft.	14	9
50 ft. and over	15	9

No pile with butt diameter over 18 in., nor top diameter over 13½ in., will be accepted. The length of each pile is to be legibly marked on the butt with white or black paint.

PROPOSED TENTATIVE SPECIFICATIONS FOR SOUTHERN YELLOW-PINE TIMBER TO BE CREOSOTED

1. The specifications as to strength shall agree with the requirements that will be finally adopted by the society under the Standard Classification of Structural Timber, covering the number of rings per inch or some substitute therefor. (Included in this section will also be a list of the allowable defects, etc.)

2. All pieces shall show at least 30 per cent sapwood in cross-section. This is based on a minimum treatment of 12 lb. of creosote per cubic foot of timber.

3. In bridge stringers knots greater than 1½ in. in diameter shall be at least 4 in. from the edges of the stick. There shall be no knots more than 4 in. in greatest diameter in any part of the stick.

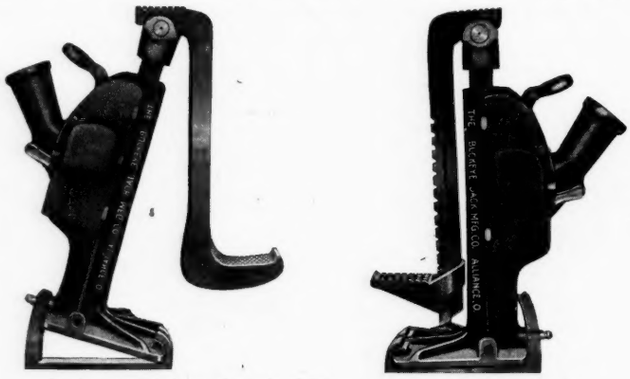
4. Caps, sills, posts and sawed poles must be free from knots more than 2½ in. in diameter.

5. Longitudinal bracing, cross-arms and similar pieces having small cross-section shall have no knots more than 1 in. in diameter.

6. Track ties shall show at least 20 per cent sapwood in cross-section. This is based on a minimum full-cell treatment of 8 lb. creosote per cubic foot of timber.

EMERGENCY JACKS

The jacks shown in the illustration include several features which are especially valuable in equipment designed for emergency use. These are the swivel top, to which is pivoted an auxiliary hook for low lifting operations and an auxiliary heel plate which enables the operator to use the jack at an angle without blocking up. An adjustable auxiliary lift is shown on one of the jacks, which may be quickly adjusted to the load without sacrificing a portion of the lifting range of the jack. The foot of the jack is so designed that the auxiliary heel plate may be applied in two positions at right angles to each other, thus permitting the operation of the jack tilted either sideways or forward. The heel plate provides a substantial footing for the tool in any position without the necessity of special blocking. When so desired it may be removed and the jack operated upon its own base.



Jacks with Adjustable Heel Plates and Low Lifting Hooks

These jacks have recently been added to the line of the Buckeye Jack Manufacturing Company, Alliance, Ohio. In designing them special attention was given to the elimination of unnecessary parts in order that the number of repair parts required may be kept at a minimum. The parts are easily assembled, and repairs may be made by the ordinary shop labor.

General News Department

The Chicago & Alton has increased the working time at its shops at Bloomington, Ill., from eight to nine hours a day.

In the Federal Court at Charleston, W. Va., July 2, the government filed suit against the Chesapeake & Ohio for 21 violations of the hours-of-service law, the charges relating to the operation of freight trains on the Coal River branch.

The Carolina, Clinchfield & Ohio is now open for regular passenger and freight business to Elkhorn City, Ky., 35 miles north of the former northern terminus at Dante, Va. Through passenger trains began running on the first of July.

The Interstate Commerce Commission, Department of Valuation, has modified its valuation order No. 9, fixing the compensation of the railways for the movement of outfit cars used by the federal valuation parties so as to provide a minimum charge of $2 per movement.

During the month of June the Norfolk & Western dumped 853,845 tons of coal over its coal piers at Lambert's Point, Norfolk, establishing a new high record. The record for the previous month was 716,002 tons, which was the previous high record, exceeding that of 694,000 tons established in September, 1914.

The Southern Pacific announces that the Panama-Pacific Exposition has awarded to it the grand prize, which will consist of a medal and a diploma covering track, equipment and shop products, and the company's safety first exhibition in the Transportation building; and also the traffic promotion exhibit in the company's own building.

In the state court at Columbia, S. C., July 2, the Southern Railway and other carriers secured a temporary injunction restraining the state tax commissioners, and other state officers, from collecting the three-mill annual license tax imposed on the railroads, insofar as the assessment is based on income from interstate commerce. The court will give a hearing on July 15.

Patrick W. Mulligan, crossing watchman of the Pennsylvania at Norristown, Pa., who received from President Wilson a medal, awarded in accordance with the Act of Congress, in recognition of his heroism in saving a little child who was in danger of being run over by a locomotive, has received a second medal, one from the Carnegie Hero Fund.

The Pennsylvania Public Service Commission has prepared a report showing that there are 151 tunnels in operation in that state. These tunnels aggregate 31 miles in length, the longest being at Greentree on the Wabash-Pittsburgh, which is 4,716 ft. long. Others are at Gallitzin, on the Pennsylvania, 4,716 ft.; Mahanoy, Philadelphia & Reading, 3,406 ft., and Big Savage, Western Maryland, 3,296 ft. The Gallitzin and Mahanoy tunnels have electric ventilating apparatus.

J. A. McCrea, general manager of the Long Island, says that it is only by the rarest chance that there was not a series of disastrous accidents to automobiles at grade crossings on that road during the week ending June 28. Every day he receives reports to the effect that the crossing gates at this or that place have been broken by drivers who thought more of speed than of safety. In that one week there were a dozen or more such cases. Mr. McCrea has issued a list of these "near accidents."

The San Pedro, Los Angeles & Salt Lake has issued to its employees a special bulletin on trespassing, urging them to begin a campaign of agitation in their individual circles of influence to arouse the public to a realization of the dangers of trespassing. The bulletin says: "The Salt Lake route is a safe road to ride upon. In the last eight years no passengers have been killed in train accidents. It is a very unsafe road to walk upon. During the same period 101 trespassers have been killed."

Upon the recent retirement of William McNab, principal assistant engineer, Grand Trunk, from the board of direction of the American Railway Engineering Association after a continuous service of 11 years, he was elected an honorary member of the governing board and appropriate resolutions were passed in appreciation of his long service in various important positions, including that of president. These resolutions have been incorporated in an elaborate book which has been prepared for presentation to Mr. McNab.

In the United States District Court at New York City, July 7, Judge Grubb and a jury decided in favor of the New York, New Haven & Hartford Railroad in the suit for $25,000 damages brought by Florence Clarke, a widow of George L. Clarke, engineer of the Boston Express, who was killed in the Westport derailment, October 3, 1912. Mrs. Clarke contended that the wreck was due to the bad condition of the track. Counsel for the New Haven convinced the jury that it was Engineer Clarke's failure to obey the stop signals set against the train that resulted in the wreck. All the other suits for loss of life have been settled by the road. It has also paid $450,000 to claimants for personal injuries.

A remarkable record has just been made by the maintenance of way department of the Lehigh Valley in the loading of rails. Two work trains, equipped with every sort of a loading device from a locomotive crane to a ditching machine, in one day loaded from alongside the tracks 171,988 feet of 90-lb. relaying rail, with joints complete. This amount of work equals 2,303.41 tons or 16 track miles, believed to be the greatest amount of rail ever loaded on one division in one day. The cost of this work amounted to 15.7 cents a ton. A few days later on the Seneca division of the same road one work train loaded 149,466 feet of 90-lb. rail with joints complete, an even greater record. This equals 14.15 track miles or 2,001.78 tons of rail; cost per ton 15.6 cents.

President Fairfax Harrison, of the Southern Railway, has signalized the close of the company's fiscal year by sending to all officers and employees the following message: "We are closing today a fiscal year which has been full of anxiety and difficulty, but through team work and loyal self-sacrifices and effort by the entire organization, we have come out of it sound and full of courage for the future. This result has not been due to any one man or to any group of men, but to the co-operation of every man who has recognized the problem and given us in our common duty the best that was in him. I send my personal thanks then to everyone of you. The fight is not yet over, but the spirit of the past ten months is bound to see us through. Meanwhile, I want you to know my pride in you and in what has been done already."

J. E. Sexton, general manager of the Eureka & Palisade, the narrow gage railroad running trains three times a week between Palisade, Nev., and Eureka, 84 miles, who has complained, without avail, to the postoffice department because the government hires the mails carried by a mule team—taking 33 hours to traverse the 84 miles, when his train runs through in ten hours—has written an open letter to the presidents of the Southern Pacific and the Atchison, Topeka & Santa Fe to enlist their assistance. In this letter he begins by protesting, as a stockholder, against the granting of free transportation by these roads to the employees of the California State Railroad Commission, which free transportation, he says, is contrary to the provisions of the constitution of that state. The commission has 200 employees and they travel all over the state on many errands, having nothing to do with railroad business, their investigations having to do with water companies, light companie sand other kinds of public utilities. From this general protest against the over-reaching practices of government, Mr. Sexton goes on to re-state his grievance against the postoffice department. With this our readers have already been made acquainted. The gist of the complaint is that the government is working against its own interest when, following the technicalities of the law, it employs a slow mule team to carry mail which could be carried much more quickly

by the steam locomotive. Referring to the postmaster general and his action under the constitution, Mr. Sexton says: "If the constitution was formed to establish justice, insure domestic tranquillity and guarantee to every person the equal protection of the law, the postmaster general is yet ignorant of the fact, but I will venture the opinion that if the inhibition complained of militated against a man because he was a member of a labor organization, there would be no tranquillity around his official roost at Washington until some action was taken."

Summary of Revenues and Expenses of Large Steam Roads

The following figures were compiled by the Interstate Commerce Commission from monthly reports of operating revenues and expenses of large steam roads for April, 1915. No reports are included for roads whose operating revenues for the year ended June 30, 1914, did not reach $1,000,000. The figures are compiled as rendered and should not be considered final, inasmuch as scrutiny of the reports may lead to their modification before acceptance.

FOR THE MONTH OF APRIL

Item	United States Amount	United States Per mile of road operated		Eastern District Amount	Eastern District Per mile of road operated		Southern District Amount	Southern District Per mile of road operated		Western District Amount	Western District Per mile of road operated	
	1915	1915	1914*	1915	1915	1914*	1915	1915	1914*	1915	1915	1914*
Average number of miles operated	228,736.02	...	...	58,823.22	...	...	42,367.16	...	...	127,545.64	...	...
Revenues:												
Freight	$161,998,973	$708	$715	$75,301,759	$1,280	$1,233	$26,597,178	$628	$652	$60,100,036	$471	$495
Passenger	47,083,876	206	226	20,787,306	354	381	6,437,497	152	179	19,859,073	155	170
Mail	4,745,337	21		1,725,434	29		626,401	15	15	2,393,502	19	
Express	5,756,315	25	74	2,631,225	45	135	878,815	21	22	2,246,275	18	54
All other transportation	6,692,957	29		3,733,072	64		626,941	15	16	2,332,944	18	
Incidental	4,544,845	20	22	2,304,435	39	43	631,097	15	16	1,609,313	13	13
Joint Facility—Cr.	289,367	1	1	138,949	2	2	60,693	1	1	90,125	1	1
Joint Facility—Dr.	—114,240	...	...	—71,728	1	...	—21,677	—1	...	—20,835	...	...
Railway operating revenues	$230,997,430	$1,010	$1,038	$106,550,052	$1,812	$1,794	$35,836,945	$846	$901	$88,610,433	$695	$733
Expenses:												
Maint. of way and structures	$31,655,184	$138	$145	$12,927,218	$220	$223	$5,036,576	$119	$125	$13,691,390	$108	$115
Maintenance of equipment	40,608,848	177	189	19,512,988	332	343	6,497,033	153	178	14,,598,827	115	121
Traffic	4,942,055	22	22	1,868,147	32	32	886,999	21	22	2,186,909	17	17
Transportation	80,366,312	351	389	37,865,900	644	704	11,893,336	281	323	30,607,076	240	264
Miscellaneous operations	1,762,977	8	10	783,474	13	21	179,284	4	5	800,219	6	7
General	6,307,607	28	28	2,747,807	46	47	992,276	24	25	2,567,524	20	21
Transportat'n for Investm't—Cr.	—511,599	—2	—1	—81,816	—1	...	—76,561	—2	...	—353,222	—3	—1
Railway operating expenses	$165,131,384	$722	$782	$75,623,718	$1,286	$1,370	$25,408,943	$600	$678	$64,098,723	$503	$544
Net revenue from railway operations	$65,866,046	$288	$256	$30,926,334	$526	$424	$10,428,002	$246	$223	$24,511,710	$192	$189
Railway tax accruals	$11,106,959	$49	$50	$4,692,664	$80	$81	$1,540,684	$36	$38	$4,873,611	$38	$40
Uncollectible railway revenues	49,880	...	...	17,138	...	...	9,760	...	...	22,992	...	...
Railway operating income	$54,709,207	$239	$206	$26,316,542	$446	$343	$8,877,558	$210	$185	$19,615,107	$154	$149

FOR THE TEN MONTHS ENDING WITH APRIL

	1915	1915	1914*	1915	1915	1914*	1915	1915	1914*	1915	1915	1914*
Average number of miles operated	228,432.08	...	...	58,776.53	...	...	42,308.22	...	...	127,347.33	...	...
Revenues:												
Freight	$1,654,171,380	$7,241	$7,768	$720,826,067	$12,264	$13,126	$254,908,669	$6,025	$6,734	$678,436,644	$5,328	$5,608
Passenger	524,174,515	2,295	2,544	229,837,106	3,910	4,197	72,349,898	1,710	1,995	221,987,511	1,743	1,955
Mail	47,572,112	208		17,305,351	295		6,269,348	148	148	23,997,413	189	
Express	56,785,732	249	802	25,419,154	432	1,471	8,549,844	202	230	22,816,734	179	580
All other transportation	68,677,904	301		38,058,980	648		5,637,639	133	151	24,981,285	196	
Incidental	48,255,601	211	226	24,974,784	425	442	6,089,608	144	160	17,191,209	135	147
Joint Facility—Cr.	2,922,823	13	13	1,321,882	22	21	580,041	14	14	1,020,900	8	9
Joint Facility—Dr.	—1,044,373	—5	—4	—657,477	—11	—8	—137,530	—3	—3	—249,366	—2	—2
Railway operating revenues	$2,401,516,694	$10,513	$11,349	$1,057,085,847	$17,985	$19,249	$354,247,517	$8,373	$9,429	$990,182,330	$7,776	$8,297
Expenses:												
Maint. of way and structures	$297,808,893	$1,304	$1,482	$125,645,129	$2,138	$2,497	$48,428,216	$1,145	$1,244	$123,735,548	$972	$1,087
Maintenance of equipment	418,347,393	1,832	1,982	197,385,994	3,358	3,666	67,952,843	1,606	1,778	153,008,556	1,201	1,263
Traffic	49,405,892	216	231	18,808,789	320	349	9,218,413	218	222	21,378,690	168	179
Transportation	857,076,295	3,752	4,149	398,390,941	6,778	7,562	123,543,524	2,920	3,278	335,141,830	2,632	2,844
Miscellaneous operations	19,008,489	83	108	8,905,629	152	210	1,840,001	43	49	8,262,859	65	79
General	61,740,039	270	279	26,312,120	448	453	9,903,529	234	246	25,524,390	200	210
Transportat'n for Investm't—Cr.	—5,445,554	—24	—11	—632,140	—11	...	—1,106,858	—26	—3	—3,706,556	—29	—19
Railway operating expenses	$1,697,941,447	$7,433	$8,220	$774,816,462	$13,183	$14,737	$259,779,668	$6,140	$6,814	$663,345,317	$5,209	$5,543
Net revenue from railway operations	$703,574,247	$3,080	$3,129	$282,269,385	$4,802	$4,512	$94,467,849	$2,233	$2,615	$326,837,013	$2,567	$2,654
Railway tax accruals	$111,305,078	$487	$500	$45,989,038	$782	$800	$15,526,059	$367	$376	$49,789,981	$391	$401
Uncollectible railway revenues	448,219	2	...	155,956	3	...	79,103	2	...	213,160	2	...
Railway operating income	$591,820,950	$2,591	$2,629	$236,124,391	$4,017	$3,712	$78,862,687	$1,864	$2,239	$276,833,872	$2,174	$2,253

*Because of changes in accounting classifications, consolidations of companies, etc., comparative averages are approximate only

Accident Record—Correction

An officer of the Baltimore & Ohio writes that the number of trespassers killed in the derailment at Belmont, Ohio, May 14, reported in the Railway Age Gazette, June 18, page 1414, was two, not eight.

Efficiency on the New Haven

The efficiency bureau of the New York, New Haven & Hartford, since June 1, 1914, has made improvements in the view for wayfarers on the highway at 250 grade crossings; and a large number of crossings had been improved before that date.

At about 40 stations on the road, some near New York and some near Boston, red or white stripes have been painted on the platforms, on the side adjacent to the track to warn passengers to keep back. The stripe is 3 in. wide and about 30 in. from the edge of the platform.

The standard clearance diagram of the company, designed to prevent the erection of any structure or the placing of any material too near the tracks has been the subject of investigation

throughout the company's territory and a strict enforcement of the regulations has been provided for. In this connection the proper care of baggage trucks and other things at stations has been attended to, and new rules have been prescribed for the safe operation of hand cars, velocipedes and motor cars.

The division efficiency committees meet every month and by means of interlocking committees useful ideas brought out on any division are made available throughout the company's lines. The yards and the larger stations are to be supplied with first-aid cabinets.

The Mutual Magazine

This is the title of a new monthly periodical which has been started by "The Mutual Beneficial Association of Pennsylvania Railroad Employees," an organization which has been organized for the purposes indicated in the title, and which has an insurance department. It has a large membership already. Its insurance feature seems to be popular notwithstanding the existence of the well-known relief association maintained by the railroad company and the promise of pensions to all employees who are honorably retired at the age of 70. At Philadelphia and at Harrisburg the members of the association secure discounts at stores by co-operative buying. The editor of the magazine is N. F. Dougherty, 1841 Filbert street, Philadelphia, and the president of the association is George W. Brown.

The Alaskan Government Railway

Secretary Lane has received a report saying that construction work has been begun on the government railway in Alaska, and that a headquarters has been established at Ship Creek, Cook's Inlet. About 2,000 men are engaged in making wagon roads, which will be necessary to facilitate railway construction.

President Wilson has ordered the reservation of a tract 200 miles long and five to ten miles wide, along the proposed railroad line, to provide a supply of timber for use in the construction of the track, this land, however, being open to settlement, nevertheless.

The General Land office at Seward announces that there will be an auction sale of town sites along the route of the railway on July 9.

A Resume of the Mail Pay Question

The Committee on Railway Mail Pay, Ralph Peters, New York, chairman, has issued a booklet entitled "What the Railway Mail Pay Problem Means to the Railroads," summarizing the facts relating to this controversy, and copies of it have been sent to all members of Congress, state and federal regulative commissions, and many other persons in public life. The Moon bill, as here analyzed, is shown to amount to an almost complete delegation of the rate-making power, as far as the transportation of the mails is concerned, to the postmaster general, who would be vested, under its terms, with authority to make the rates anything he might choose, "not exceeding" certain specified sums. He could reduce the rates without restriction and could also dictate, in almost every respect, the character and extent of service the railroads would be required to render. The railroads would be compelled to perform such service as the postmaster general might demand, at such rates as he might choose to pay, under penalty of $5,000 a day for each refusal.

The committee restates its position as follows:

1. The mails should be weighed, and the pay be readjusted, at least once a year instead of once in four years.

2. The railroads should be paid for the use and operation of apartment post office cars—for which the present law allows no pay.

3. The railroads should be paid for, or relieved from, the duty of carrying the mails between railroad stations and post offices.

The railroad presidents at their recent meeting in New York City approved the suggestion of the committee that the ultimate solution of the problem would lie in reference of the matter to the Interstate Commerce Commission, with full power.

Boston Terminal Commission

The Massachusetts legislature has provided for the appointment of a commission, to serve without pay, to investigate the subject of terminal facilities and the improvement of facilities for the transportation of freight in the Metropolitan district (Boston). The members are chosen partly by the legislature and partly by the governor of the state and the mayor of Boston. They are Charles M. Spofford, consulting engineer and head of the department of civil and sanitary engineering of the Massachusetts Institute of Technology; Luke D. Mullen; Senators James F. Cavanagh and Martin Hays; Representatives H. A. Wilson, F. P. Greenwood and Robert Robinson, and F. H. Prince and W. H. Coolidge appointed by the mayor. One specific feature in the committee's work will be to determine what proportion of the cost of improvements or developments should be borne by the state, what the city of Boston and what by public service corporations.

MEETINGS AND CONVENTIONS

The following list gives the names of secretaries, dates of next or regular meetings, and places of meeting of those associations which will meet during the next three months. The full list of meetings and conventions is published only in the first issue of the Railway Age Gazette for each month.

AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—F. A. Pontious, 455 Grand Central Station, Chicago. Next meeting, July 21, 1915, Milwaukee, Wis.

AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—E. H. Harman, Room 101, Union Station, St. Louis, Mo. Next meeting, August 19-20, 1915, San Francisco, Cal.

AMERICAN RAILROAD MASTER TINNERS, COPPERSMITHS AND PIPEFITTERS' ASSOCIATION.—W. E. Jones, C. & N. W., 3814 Fulton St., Chicago. Annual meeting, July 13-16, 1915, Hotel Sherman, Chicago.

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—Owen D. Kinsey, Illinois Central, Chicago. Annual meeting, July 19-21, 1915, Hotel Sherman, Chicago.

AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa. Annual meeting, June 22-26, 1915, Hotel Traymore, Atlantic City, N. J.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—Chas. Warren Hunt, 220 W. 57th St., New York. Regular meetings, 1st and 3d Wednesday in month, except July and August, 220 W. 57th St., New York.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W., Room 411, C. & N. W. Sta., Chicago. Semi-annual meeting with Master Car Builders' and Master Mechanics' Association. Annual meeting, October, 1915.

CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk, P. O. Box 7, St. Lambert (near Montreal), Que. Regular meetings, 2d Tuesday in month, except June, July and August, Windsor Hotel, Montreal, Que.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 Lawlor Ave., Chicago. Regular meetings, 2d Monday in month, except June, July and August, Hotel La Salle, Chicago.

CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York, Regular meetings, 2d Friday in January, May, September and November. Annual meeting, 2d Thursday in March, Hotel Statler, Buffalo, N. Y.

ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—Elmer K. Hiles, 2511 Oliver Bldg., Pittsburgh, Pa. Regular meetings, 1st and 3d Tuesday of each month, Pittsburgh.

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—A. M. Hunter, 321 Grand Central Station, Chicago. Regular meetings, Wednesday, preceding 3d Thursday in month, Room 1856, Transportation Bldg., Chicago.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, 1126 W. Broadway, Winona, Minn. Next convention, July 13-16, 1915, Sherman House, Chicago.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—A. L. Woodworth, C. H. & D., Lima, Ohio. Annual meeting, August 17, 1915, Philadelphia, Pa.

NIAGARA FRONTIER CAR MEN'S ASSOCIATION.—E. N. Frankenberger, 623 Brisbane Bldg., Buffalo, N. Y. Meetings, 3d Wednesday in month, New York Telephone Bldg., Buffalo, N. Y.

PEORIA ASSOCIATION OF RAILROAD OFFICERS.—M. W. Rotchford, 410 Masonic Temple Bldg., Peoria, Ill. Regular meetings, 3d Thursday in month, Jefferson Hotel, Peoria.

RAILROAD CLUB OF KANSAS CITY.—Claude Manlove, 1008 Walnut St., Kansas City, Mo. Regular meetings, 3d Saturday in month, Kansas City.

RAILWAY TELEGRAPH AND TELEPHONE APPLIANCE ASSOCIATION.—G. A. Nelson, 50 Church St., New York. Meetings with Association of Railway Telegraph Superintendents.

SALT LAKE TRANSPORTATION CLUB.—R. E. Rowland, David Keith Bldg., Salt Lake City, Utah. Regular meetings, 1st Saturday of each month, Salt Lake City.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. P. R. R., Atlanta, Ga. Next meeting, July 15, 1915, Atlanta. Annual meeting, January, 1916.

SOUTHERN & SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grant Bldg., Atlanta, Ga. Regular meetings, 3d Thursday, January, March, May, July, September, November, 10 A. M., Piedmont Hotel, Atlanta.

TOLEDO TRANSPORTATION CLUB.—Harry S. Fox, Toledo, Ohio. Regular meetings, 1st Saturday in month, Boody House, Toledo.

TRAFFIC CLUB OF CHICAGO.—W. H. Wharton, La Salle Hotel, Chicago.

TRAFFIC CLUB OF PITTSBURGH.—D. L. Wells, Genl. Agt., Erie R. R., 1924 Oliver Bldg., Pittsburgh, Pa. Meetings bi-monthly, Pittsburgh. Annual meeting, 2d Monday in June.

TRANSPORTATION CLUB OF DETROIT.—W. R. Hurley, Superintendent's office, N. Y. C. R. R., Detroit, Mich. Meetings monthly, Normandie Hotel, Detroit.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF MAY, 1915

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses							Net operating revenue (or deficit).	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance										
		Freight.	Passenger.	Total, inc. misc.	Way and structures.	Of equipment.	Traffic.	Transportation.	Miscellaneous.	General.	Total.				
Alabama & Vicksburg	143	$81,878	$32,108	$125,288	$15,103	$30,816	$3,684	$46,172	$1,958	$5,272	$103,006	$22,282	$8,750	$13,532	$10,841
Alabama Great Southern	309	296,005	81,556	412,099	46,219	91,027	10,754	154,106	2,721	7,921	305,928	106,171	15,152	90,585	67,899
Ann Arbor	294	143,147	38,213	193,529	24,288	19,871	5,477	75,193	422	7,635	132,886	60,643	10,580	50,057	10,012
Arizona Eastern	367	182,474	31,816	225,695	31,225	20,529	2,395	51,992	936	11,640	118,664	107,031	12,460	94,489	—12,255
Atchison, Topeka & Santa Fe	8,514	5,330,554	1,999,440	8,081,068	1,009,156	1,344,393	239,718	2,271,888	.....	185,681	5,034,558	3,046,509	397,331	2,646,300	260,842
Atlanta & West Point	93	44,310	34,857	92,186	10,744	19,372	5,278	29,044	1,564	5,739	71,741	20,445	5,525	14,877	6,477
Atlanta, Birmingham & Atlantic	639	142,198	36,814	204,412	33,200	41,858	13,337	94,764	.....	10,122	193,282	11,131	13,100	—3,209	—18,789
Atlantic & St. Lawrence	167	58,117	28,428	98,586	26,751	15,980	3,056	41,905	.....	2,962	90,653	7,933	10,800	—2,867	—10,470
Atlantic Coast Line	4,701	1,796,562	565,279	2,596,949	376,095	456,143	51,584	958,853	7,522	70,266	1,919,647	677,303	112,000	565,171	—62,368
Baltimore & Ohio—System	4,516	6,595,936	1,089,635	8,276,206	686,985	1,304,449	154,644	2,756,861	45,211	215,321	5,162,801	3,113,405	278,135	2,834,156	1,288,189
Baltimore & Ohio Chicago Terminal	79	.....	549	124,353	14,118	15,677	889	49,989	1,367	4,458	82,714	41,639	17,654	23,985	18,644
Bangor & Aroostook	631	216,233	47,955	281,566	43,069	42,881	2,625	74,656	3,326	11,592	178,149	103,418	12,525	90,893	—20,942
Belt Ry. Co. of Chicago	24	.....	.....	235,734	20,001	18,086	597	80,553	.....	5,948	125,186	110,548	14,547	96,001	—7,596
Bessemer & Lake Erie	205	947,623	24,074	984,221	45,743	164,355	10,197	208,638	.....	11,740	429,437	554,785	16,779	538,001	281,895
Bingham & Garfield	27	158,896	2,815	162,415	18,150	18,184	1,055	28,440	64	2,981	68,875	93,540	4,252	89,288	—729
Buffalo & Susquehanna R. R. Corporation	253	106,075	5,978	114,781	21,671	41,536	931	32,658	.....	5,053	101,850	12,931	2,600	10,331	31,947
Buffalo & Susquehanna Railway	91	12,767	6,040	21,337	4,113	5,207	400	10,244	7	2,286	22,257	—920	1,600	—2,520	6,126
Buffalo, Rochester & Pittsburgh	586	686,822	83,501	805,357	116,821	158,967	10,715	257,723	882	22,406	567,516	237,841	20,000	217,804	139,819
Canadian Pacific Lines in Maine	233	52,812	16,221	78,180	21,755	12,045	4,831	35,542	.....	3,288	77,462	718	8,000	—7,282	15,278
Carolina, Clinchfield & Ohio	248	160,012	13,523	177,518	21,575	22,633	8,185	35,715	.....	11,440	98,964	78,554	7,500	71,000	—9,376
Carolina, Clinchfield & Ohio of S. C.	18	8,896	872	10,059	1,997	72	1,763	2,061	.....	1,367	7,259	2,800	.....	2,800	—525
Central of Georgia	1,924	530,458	228,403	858,157	127,272	153,166	37,139	314,931	1,576	34,853	667,928	190,228	51,923	137,332	88,046
Central of New Jersey	678	1,917,075	469,933	2,524,041	239,007	485,737	26,138	853,729	12,494	56,381	1,673,486	850,555	117,447	733,108	122,842
Central New England	304	341,678	32,837	390,174	68,876	26,627	1,963	121,300	.....	5,324	224,054	166,120	12,000	154,120	89,304
Charleston & Western Carolina	341	102,831	21,529	130,367	26,593	14,412	2,763	49,937	.....	4,659	98,364	32,004	5,000	27,004	23,016
Chesapeake & Ohio Lines	2,372	2,846,147	464,361	3,523,110	476,901	724,385	51,730	1,093,345	19,010	75,968	2,436,794	1,086,316	115,009	970,645	295,261
Chicago & Alton	1,033	749,900	291,104	1,142,218	138,229	241,152	32,174	402,233	9,399	28,695	851,881	290,337	43,002	246,988	117,441
Chicago & Erie	270	413,190	42,891	499,985	75,642	66,318	17,566	215,245	2,254	12,444	389,402	110,583	20,500	90,079	107,940
Chicago & North Western	8,108	4,068,491	1,530,857	6,295,180	915,340	922,506	80,202	2,347,493	51,600	148,036	4,459,144	1,836,036	375,000	1,459,720	592,656
Chicago, Burlington & Quincy	9,367	4,705,936	1,498,112	6,957,421	1,459,097	1,269,651	144,598	2,183,814	92,686	167,762	5,317,609	1,639,812	331,300	1,308,512	404,299
Chicago, Detroit & Can. Gd. Trunk Jctn.	60	57,501	11,638	80,097	10,734	10,770	1,428	41,139	.....	1,181	65,251	14,846	2,870	11,976	116
Chicago Great Western	1,427	756,571	229,989	1,087,531	193,099	206,129	45,844	402,978	7,655	24,265	879,066	208,464	47,150	161,092	14,065
Chicago, Indianapolis & Louisville	618	374,481	151,562	572,233	77,665	80,473	20,957	207,123	148	16,996	403,355	168,878	27,474	141,419	38,379
Chicago Junction	24	.....	.....	168,043	23,446	18,963	954	88,056	.....	5,685	137,554	30,489	1,858	28,340	—14,934
Chicago, Milwaukee & St. Paul	10,071	5,126,371	1,353,554	7,244,196	1,019,554	1,250,645	144,660	2,797,470	58,494	162,284	5,179,907	2,064,289	369,823	1,689,633	—140,944
Chicago, Peoria & St. Louis	255	84,776	20,668	113,265	22,547	29,043	5,559	51,736	.....	5,226	114,111	—846	5,700	—6,546	—958
Chicago, Rock Island & Gulf	477	137,329	43,562	198,109	40,070	32,849	10,148	89,722	1,659	8,379	182,827	15,282	8,097	7,102	3,205
Chicago, Rock Island & Pacific	7,852	3,403,285	1,355,537	5,138,201	750,981	964,792	147,375	2,015,804	47,833	136,936	4,062,359	1,075,842	277,884	797,628	344,876
Chicago, St. Paul, Minneapolis & Omaha	1,753	830,242	352,531	1,285,893	178,346	188,863	28,918	502,835	16,233	35,951	949,438	336,455	76,672	258,853	239,419
Chicago, Terre Haute & Southeastern	374	133,057	14,497	151,454	21,127	36,927	3,623	48,398	755	9,767	120,599	30,855	12,500	18,355	20,751
Cincinnati, Hamilton & Dayton	1,003	663,400	115,332	869,965	170,449	200,384	20,896	362,664	2,853	19,125	775,533	94,431	28,650	65,551	36,222
Cincinnati, New Orleans & Tex. Pac	337	661,371	119,159	831,801	78,741	168,389	20,698	260,008	5,814	18,473	551,692	280,110	31,000	248,864	25,222
Cincinnati Northern	246	106,259	12,855	124,024	30,862	27,001	2,546	41,556	.....	4,044	106,009	18,016	5,500	12,514	12,411
Cleveland, Cincinnati, Chicago & St. L.	2,381	1,998,039	680,445	2,953,699	392,110	570,773	68,010	1,098,551	24,539	69,256	2,216,676	737,024	123,000	608,660	423,367
Colorado Midland	338	84,985	13,125	105,374	26,062	26,061	6,722	49,498	926	5,391	114,660	—9,286	10,000	—19,286	9,885
Cumberland Valley	164	168,312	49,724	229,367	45,850	26,628	4,093	73,577	802	8,781	159,731	69,636	5,794	63,842	—23,577
Delaware & Hudson Co.—R. R. Dept	881	1,593,673	190,874	1,879,410	139,309	303,623	24,909	635,899	12,958	61,680	1,177,828	701,581	58,500	643,081	12,521
Delaware, Lackawanna & Western	959	2,663,891	668,198	3,713,265	475,054	476,913	80,100	1,168,666	27,980	76,135	2,282,783	1,430,482	186,600	1,243,873	196,993
Detroit & Mackinac	400	57,103	21,490	83,929	15,536	16,898	1,794	31,479	.....	3,058	68,766	15,163	7,503	7,659	—8,567
Detroit & Toledo Shore Line	79	119,720	.....	120,044	13,224	8,773	1,624	34,822	.....	2,718	61,162	58,882	5,045	53,837	19,160
Detroit, Grand Haven & Milwaukee	191	135,000	44,000	204,038	36,671	37,268	5,938	114,889	602	4,984	200,352	3,686	3,360	320	15,646
Duluth & Iron Range	273	718,481	15,850	745,851	71,329	43,033	1,045	138,924	528	9,782	264,641	481,210	37,068	444,141	219,332
Duluth, Missabe & Northern	369	1,249,684	24,212	1,280,216	116,658	98,507	1,975	162,716	Cr. —956	9,200	388,100	892,115	63,981	828,134	577,980
El Paso & Southwestern Co	1,027	536,828	114,400	693,470	104,382	93,812	18,708	173,902	7,168	25,453	423,424	270,046	34,889	235,146	—18,614
Elgin, Joliet & Eastern	777	753,789	7	801,203	115,075	118,851	6,291	215,854	.....	23,167	479,216	321,987	40,890	281,097	80,931
Erie	1,988	3,518,354	728,913	4,681,847	459,627	1,168,200	93,850	1,656,314	29,237	101,548	3,501,704	1,180,142	168,654	1,010,155	—357,944
Florida East Coast	745	457,483	123,782	656,143	52,054	59,511	8,020	172,082	4,425	18,482	311,791	344,352	16,533	327,810	90,765
Fort Worth & Denver City	454	245,005	93,716	363,005	51,527	76,918	6,256	121,198	2,374	15,189	273,733	89,271	12,621	76,651	39,492
Georgia	307	127,542	55,597	198,805	22,254	48,057	11,139	92,990	371	4,813	178,041	20,764	3,137	17,606	—2,620
Grand Rapids & Indiana	575	269,964	109,659	407,773	59,461	78,207	10,002	172,783	85	15,412	335,951	71,823	21,513	50,309	—18,265
Grand Trunk Western	347	419,000	121,000	576,381	92,078	127,730	17,156	244,977	5,658	9,905	497,504	78,877	35,920	42,951	28,433
Great Northern	8,077	3,336,982	916,841	4,801,733	988,610	557,238	92,360	1,383,817	64,621	111,629	3,195,246	1,606,487	555,741	1,050,382	162,197
Gulf & Ship Island	308	97,678	25,113	131,991	21,579	30,157	2,474	33,563	308	7,069	95,150	36,841	7,419	29,333	5,739
Hocking Valley	351	416,024	62,076	518,576	51,271	79,905	8,545	167,638	.....	13,429	320,787	197,788	34,050	103,739	56,267
Illinois Central	4,767	3,475,626	979,062	4,838,776	801,351	1,093,379	106,119	1,741,550	29,035	130,588	3,875,171	963,605	281,400	680,556	—152,650
Indiana Harbor Belt	110	.....	.....	267,109	35,957	24,077	2,785	106,744	.....	7,758	177,321	89,788	8,080	81,700	6,561
International & Great Northern	1,159	574,882	121,967	748,207	117,211	122,612	19,335	337,348	2,978	29,536	629,019	119,188	30,000	89,050	75,801
Kanawha & Michigan	177	200,809	28,359	235,656	27,894	42,475	2,815	65,552	37	6,477	145,250	90,406	11,600	78,806	23,281
Kansas City Southern	827	654,628	108,564	831,874	104,319	92,327	26,106	259,632	.....	44,221	516,813	315,061	48,197	266,190	35,581

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF MAY, 1915—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses							Net operating revenue (or deficit).	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance										
		Freight.	Passenger.	Total, inc. misc.	Way and structures.	Of equipment.	Traffic.	Transportation.	Miscellaneous.	General.	Total.				
Lake Erie & Western	900	$383,375	$57,832	$463,564	$66,930	$98,994	$11,909	$175,843	.....	$12,232	$365,908	$97,657	$24,000	$73,577	$27,048
Lehigh & Hudson River	97	156,734	9,503	167,620	25,013	18,121	1,568	53,325	.....	3,850	101,876	65,744	4,150	61,594	710
Lehigh & New England	296	251,027	1,055	266,006	36,949	39,784	3,080	63,238	.....	4,890	147,940	118,066	5,104	112,962	3,794
Lehigh Valley	1,443	3,304,188	323,900	3,845,270	455,012	600,864	88,181	1,256,441	$11,598	71,841	2,482,637	1,362,633	142,500	1,219,746	108,487
Long Island	398	329,001	703,518	1,177,445	137,713	128,061	10,632	442,713	6,544	27,729	753,392	424,053	76,169	347,682	753
Louisiana & Arkansas	279	134,471	13,184	151,665	26,546	23,388	3,164	33,217	.....	4,080	90,396	61,269	7,500	53,765	10,460
Louisiana Ry. & Navigation	351	138,557	28,617	176,938	36,741	19,441	5,835	64,721	.....	5,356	132,095	44,843	11,500	33,343	4,923
Louisville & Nashville	5,034	2,963,392	852,494	4,163,368	815,674	785,193	110,386	1,322,617	21,695	102,567	3,134,020	1,029,348	200,710	828,247	226,705
Louisville, Henderson & St. Louis	200	64,904	31,240	102,854	27,962	16,197	4,618	36,038	.....	3,658	88,473	14,381	3,800	10,565	—13,684
Maine Central	1,219	582,317	239,056	888,379	144,570	150,653	11,041	329,508	1,287	28,317	665,261	223,119	53,121	169,992	—37,536
Michigan Central	1,800	1,807,414	706,406	2,814,732	360,999	465,520	60,647	1,053,219	42,561	62,822	2,045,768	768,964	121,000	647,810	189,741
Midland Valley	380	62,833	29,153	99,348	24,170	18,511	2,153	35,760	.....	3,141	88,736	10,612	4,749	5,675	—4,892
Minneapolis & St. Louis	1,646	534,061	137,711	719,578	96,629	59,887	17,725	271,880	90	20,505	466,717	252,861	30,422	222,439	114,133
Minn., St. Paul & Sault Ste. Marie	4,104	1,484,999	391,691	2,051,727	356,119	358,265	51,913	744,237	14,146	46,871	1,567,716	484,011	86,460	397,551	—56,250
Missouri & North Arkansas	365	57,330	23,835	87,646	24,296	25,947	2,588	47,609	.....	5,834	106,273	—18,627	5,269	—23,933	—15,458
Missouri, Oklahoma & Gulf	334	63,311	15,131	81,707	23,117	29,643	4,754	44,343	72	20,074	122,003	—40,295	5,128	—45,450	—16,905
Monongahela	75	101,919	1,777	105,702	15,926	14,205	347	21,840	.....	2,478	54,796	50,906	1,810	49,096	—2,519
Nashville, Chattanooga & St. Louis	1,231	610,955	198,543	885,626	122,977	167,429	40,284	344,511	6,479	33,297	714,871	170,755	26,000	144,471	—24,103
Nevada Northern	165	136,438	10,416	150,178	19,165	13,589	576	26,931	120	5,117	65,498	84,680	5,004	79,675	24,337
New Orleans & North Eastern	204	210,122	40,828	278,271	25,953	59,459	9,449	91,741	5,598	10,743	202,944	75,328	15,000	60,328	—3,353
New Orleans Great Northern	283	101,706	23,254	136,885	15,875	24,701	2,832	39,431	133	6,882	89,854	47,031	3,001	43,994	—5,783
New Orleans, Texas & Mexico	286	83,656	20,506	110,735	16,412	37,921	3,757	45,547	.....	10,281	113,917	—3,182	1,502	—4,684	—12,697
New York Central Railroad	5,979	9,111,734	3,618,055	14,789,238	1,692,585	2,736,793	219,635	4,703,641	187,427	343,408	9,883,488	4,905,750	795,884	4,109,689	.....
New York, Chicago & St. Louis	568	779,519	105,115	922,370	103,547	179,658	41,855	417,629	5,469	21,460	769,618	152,752	30,000	122,552	62,164
New York, New Haven & Hartford	2,003	2,917,949	2,221,729	5,754,808	796,493	803,090	48,527	1,995,594	49,359	139,968	3,830,422	1,924,386	185,000	1,738,272	477,371
New York, Ontario & Western	568	489,598	108,171	713,199	100,677	116,707	8,715	275,175	.....	16,187	517,462	195,738	20,150	175,587	—21,399
New York, Philadelphia & Norfolk	112	283,020	35,255	345,787	25,999	71,176	4,622	142,498	4,341	10,538	259,174	86,614	6,500	80,114	17,060
New York, Susquehanna & Western	140	209,269	48,717	277,266	24,286	31,758	1,992	101,199	.....	4,965	164,201	113,065	13,208	99,860	—37,756
Norfolk & Western	2,043	3,465,372	393,331	4,010,353	563,014	721,297	50,882	1,067,645	8,289	78,346	2,475,577	1,534,777	168,000	1,366,558	202,186
Norfolk Southern	900	199,887	78,068	299,163	46,201	50,708	7,422	135,317	64	18,687	258,399	40,764	11,750	29,012	—24,460
Northern Pacific	6,593	3,182,194	1,022,225	4,650,061	928,724	412,215	117,522	1,419,627	73,857	89,588	2,984,390	1,665,671	324,608	1,340,773	—41,198
Oregon Short Line	2,181	989,267	347,339	1,482,022	241,860	221,447	32,810	367,152	23,027	56,117	940,371	541,651	115,243	426,168	—171,571
Oregon-Washington R. R. & Nav. Co.	2,027	711,297	355,887	1,189,504	166,708	164,251	37,792	405,194	12,585	62,446	851,914	337,590	102,448	235,509	—35,299
Pennsylvania *Company*	1,757	3,437,618	765,914	4,693,336	631,931	806,082	79,106	1,616,596	31,382	124,903	3,290,000	1,403,335	253,265	1,149,701	226,466
Pennsylvania *Railroad*	4,512	11,009,777	3,132,878	15,539,078	2,004,421	3,084,639	181,782	5,247,810	215,258	403,013	11,136,923	4,402,155	639,028	3,762,413	652,301
Philadelphia, Baltimore & Washington	717	903,069	677,818	1,771,414	237,570	337,855	24,164	703,033	24	49,147	1,351,793	419,620	53,895	365,402	31,015
Pittsburgh & Lake Erie	225	1,219,531	126,601	1,401,688	133,393	226,661	22,082	310,412	3,520	28,062	724,130	677,558	49,500	628,058	253,325
Pittsburgh, Cincinnati, Chic. & St. Louis	1,479	2,171,596	636,140	3,182,505	506,987	619,725	63,941	1,171,550	24,695	81,689	2,468,588	713,918	162,379	549,875	22,123
Richmond, Fredericksburg & Potomac	88	174,295	79,912	293,015	24,140	29,359	3,641	86,887	5,641	6,927	156,595	136,420	9,686	126,699	10,577
Rutland	468	181,913	87,061	306,433	37,024	46,874	8,011	112,164	1,027	5,491	210,592	95,840	16,874	78,874	29,402
St. Joseph & Grand Island	258	86,779	24,246	119,651	17,704	20,649	4,845	46,700	.....	4,550	94,448	25,203	7,620	17,501	28,414
St. Louis & San Francisco	4,749	2,267,636	774,463	3,269,450	485,245	552,122	67,935	1,051,461	.....	82,295	2,188,973	1,080,477	117,491	961,023	670,741
St. Louis Merchants' Bridge Terminal	9	.....	180	141,433	19,220	7,941	779	68,067	.....	5,493	101,499	39,934	6,540	33,394	19,633
St. Louis Southwestern	943	397,397	80,950	509,524	18,909	89,470	25,587	153,083	3,210	25,014	315,126	194,398	37,583	156,798	57,168
St. Louis Southwestern of Texas	810	177,444	61,384	261,036	51,642	62,403	11,915	138,005	619	15,669	260,598	437	15,022	—14,645	65,136
San Antonio & Aransas Pass	724	166,370	70,032	258,636	66,022	60,531	6,619	138,885	.....	12,176	284,116	—27,280	14,077	—41,365	5,171
San Pedro, Los Angeles & Salt Lake	1,132	539,686	246,024	856,689	97,914	100,377	27,883	253,300	18,072	18,829	516,375	340,314	46,034	294,259	—20,816
Seaboard	3,123	1,208,557	353,590	1,762,317	186,164	253,766	61,477	638,734	7,883	54,874	1,202,897	559,419	86,001	472,625	—73,948
Southern	7,022	3,211,777	1,230,932	4,916,931	638,289	647,496	153,046	1,781,794	30,220	160,225	3,360,144	1,556,787	217,432	1,337,535	381,638
Southern Pacific	6,517	4,414,844	2,684,842	8,025,262	1,055,187	1,160,049	166,063	2,581,670	162,928	227,596	5,327,029	2,698,234	351,886	2,345,240	—26,495
Tennessee Central	294	84,830	32,490	124,761	27,633	13,248	4,812	45,128	.....	7,479	98,300	26,461	4,481	21,974	—8,661
Terminal R. R. Ass'n of St. Louis	35	.....	212	212,568	17,096	15,885	892	73,534	.....	4,140	111,547	101,021	28,170	72,851	36,474
Texas & Pacific	1,944	917,191	292,978	1,322,574	189,673	240,875	38,655	653,796	10,719	40,000	1,173,406	149,168	72,000	76,593	—40,515
Toledo & Ohio Central	436	265,921	42,803	332,845	58,671	65,709	6,172	133,834	1,810	10,073	276,270	56,575	21,061	35,511	94,001
Toledo, Peoria & Western	248	44,581	34,693	84,546	18,377	30,358	2,100	42,500	.....	3,923	97,259	—12,713	6,100	—18,813	14,558
Toledo, St. Louis & Western	451	329,963	27,675	384,700	44,080	102,284	15,898	136,455	.....	8,049	306,767	77,933	17,864	60,069	—37,819
Trinity & Brazos Valley	315	37,031	10,374	53,689	21,613	13,842	2,553	31,774	.....	7,028	76,810	—23,121	4,585	—27,735	29,943
Union Pacific	3,617	2,603,097	840,655	3,912,934	678,368	577,521	110,294	992,113	74,156	121,593	2,552,862	1,360,072	194,234	1,165,432	—20,067
Union R. R. of Pennsylvania	31	.....	.....	440,530	26,141	89,242	107	156,188	.....	4,310	275,987	164,543	5,301	159,242	242,808
Union R. R. of Baltimore	9	104,581	19,870	126,224	10,743	.....	.....	4,420	.....	2,697	17,860	108,365	5,825	102,539	—4,392
Vandalia	910	562,870	185,466	842,528	121,191	176,638	21,706	337,268	9,264	22,796	688,863	153,665	34,152	119,441	35,838
Vicksburg, Shreveport & Pacific	171	76,575	31,283	120,457	24,726	26,889	3,570	46,235	2,029	4,951	108,400	12,058	8,100	3,958	—5,585
Virginia & Southwestern	240	118,609	12,415	135,019	25,296	35,867	1,902	40,093	.....	3,166	106,323	28,696	7,083	21,602	—4,703
Virginian	504	420,519	31,976	481,470	72,317	90,647	5,670	98,848	9,143	12,663	285,013	196,456	20,000	176,456	—63,725
Wabash	2,519	1,690,215	468,560	2,363,452	446,605	502,160	88,200	956,593	13,760	62,157	2,068,371	295,081	78,725	216,164	40,942
Washington Southern	36	48,850	39,014	118,833	14,614	15,660	1,368	40,984	2,441	5,606	80,674	38,160	3,758	34,399	496
West Jersey & Seashore	356	173,496	314,963	534,391	87,956	78,807	9,993	215,378	2,245	15,195	409,573	124,818	28,651	96,139	—34,916
Western Maryland	661	722,866	77,678	838,251	104,956	143,065	20,584	258,906	6,099	17,872	550,082	288,168	27,000	261,168	379,441
Western Ry. of Alabama	133	54,858	33,461	98,833	20,071	20,565	5,596	30,718	1,448	4,765	83,149	15,685	5,113	10,539	1,849
Yazoo & Mississippi Valley	1,382	746,996	162,729	953,529	160,338	134,119	17,948	343,049	1,106	24,511	680,083	273,446	51,000	222,244	87,013

Traffic News

At Jackson, Miss., June 30, the state court denied the right of the railroads to charge ten cents additional fare to passengers who fail to buy tickets before entering the train.

The Chesapeake & Ohio recently issued what is believed to be the most valuable railroad ticket ever sold. It was for the "Richmond Blues," covering their journey to the Pacific coast, one ticket providing for the movement of 185 men, and the value being $17,800.

The western roads are not requiring passengers to declare the value of their baggage, as had been planned, and have postponed consideration of the Cummins law and the question of what action should be taken under it in connection with baggage. Meanwhile the carriers are assuming unlimited liabilities on all passengers' baggage.

The "Sandy Hook route" of the Central of New Jersey, from New York City to Long Branch and other New Jersey seacoast towns consists in part of a steamboat route, 20 miles long, the northern terminus of which is in Manhattan and the southern at Atlantic Highlands on the southern shore of New York Bay. This week a rival company has put on a ferryboat, bought from the City of New York, to run three times a day between these termini and to carry passengers at ten cents each, or one-sixth the fare charged on the railroad company's boats. The new line offers to make a specialty of automobiles, which will be carried at 25 cents for each foot of wheel base.

The United States Geological Survey has just issued a guide book (Bulletin 612) describing the Overland route from the Missouri river to the Pacific coast. This is the first of a series of four such books designed to afford the transcontinental traveler an intimate acquaintance with the country through which he passes. The next volume to be issued will describe the Northern Pacific route and will be published in a few days. The books describing the Santa Fe route and the Shasta and coast routes will follow soon. In these books the route is followed from station to station and the country along the way described and explained from many points of view, historical, geological, agricultural and mining. In the preparation of the book on the Overland route much information already in the possession of the Geological Survey has been utilized, but to supplement this material three geologists last year made a field examination of the entire route, while special topographic surveys for the accompanying maps were made by engineers. The route is covered by a series of 29 maps, and the book is also illustrated with half tone plates of some of the most striking views and objects to be seen on the journey. It includes 244 pages and may be obtained from the superintendent of documents at Washington.

Courtesy Over the Telephone

Don't fail to answer the 'phone just as soon as called. You cannot accomplish much work in another line while knowing that someone is calling you on the 'phone.

Don't fail to give the name of your office when answering the 'phone, as it saves the time of the party at other end.

Don't fail to give exchange the number you want very plainly.

Don't fail to have the number that you want, on the tip of your tongue when calling the exchange, as to delay her means that she is delayed in answering someone else. Possibly this someone else will sometimes be you.

Don't fail to have a pad or a memo paper nearby when taking car number, etc., over the 'phone. To jot these down takes no more time and sometimes saves a "call back," or guess work.

Don't fail to be courteous in answering the 'phone. Even though you might be a "Prince of a fellow" the party at the other end—may be a stranger—will not understand that your gruffness is a "habit" and not an intention. Courtesy costs nothing and pays big dividends.

Don't get angry when you get the wrong number. If you think the average operator has much time to loaf or that it is impossible for her to make a mistake just go to one of the telephone exchanges. One look will convince you that you are wrong.

Commission and Court News

INTERSTATE COMMERCE COMMISSION

Transcontinental Rates to Willamette Valley Points

H. S. Gile & Company et al. v. Southern Pacific et al. Opinion by the commission:

The commission finds that the through transcontinental carload and less-than-carload commodity rates to the Willamette Valley and points south of Portland, Ore., made by adding to the rates to Portland the local class rates from Portland to destination, are not preferential to points between Portland and Tacoma, but that they are unreasonable to the extent that they exceed the class rates fixed in *Railroad Commission of Oregon v. Southern Pacific* (24 I. C. C., 273), and an order is entered to that effect. (34 I. C. C., 319.)

Proportional Class Rates to Iowa Points

Opinion by the commission:

The commission grants authority to establish the same scale of proportional class rates as authorized by fourth section order No. 3,743, issued as a supplemental report to the *Interior Iowa Cities case* (29 I. C. C., 536), to apply west of the Mississippi river on traffic moving between certain additional interior Iowa cities on the Chicago, Rock Island & Pacific, and the Muscatine North and South, between Burlington and Muscatine, Iowa, and points east of the Indiana-Illinois state line. (34 I. C. C., 278.)

Rates on Lumber from South Pittsburgh, Tenn.

Haskew Lumber Company v. Nashville, Chattanooga & St. Louis et al. Opinion by Commissioner McChord:

The commission finds that the rates on lumber from South Pittsburgh, Tenn., to Ohio river crossings, of 17 cents a hundred pounds, and to Mississippi river crossings, of 22 cents, are not shown to be unreasonable or discriminatory against South Pittsburgh in favor of Chattanooga, Tenn. The tariff under which the shipments in question moved, however, named a rate of 13 cents. As the intention of the framers is not controlling with respect to the meaning of a tariff, and as the tariff is to be construed according to its language, it is found that the complainant was overcharged on shipments which were assessed charges in excess of 13 cents. (34 I. C. C., 333.)

East Bound Transcontinental Cotton Rates

Opinion by Commissioner Clements:

The commission finds that the carriers have not justified a proposed withdrawal of compression in transit arrangements on cotton from southern California and Arizona producing points to St. Louis, New Orleans, Galveston, Tex., and intermediate territory east of El Paso. Certain proposed increases in rates are held to be justified in part. (34 I. C. C., 248.)

Decision Under the Panama Canal Act

Opinion by Commissioner McChord:

The commission in this case grants the joint application of the Duluth, South Shore & Atlantic, the Grand Rapids & Indiana and the Michigan Central to continue their joint interest in and operation of the Mackinac Transportation Company, owning ferryboats plying between St. Ignace, Mich., and Mackinaw City, Mich. (34 I. C. C., 229.)

Storage in Transit on Apples at Indianapolis

Indianapolis Chamber of Commerce v. Cleveland, Cincinnati, Chicago & St. Louis et al. Opinion by Commissioner Harlan:

The refusal of the lines serving Indianapolis to permit at that point storage in transit on apples is not found to result in undue preference in favor of Chicago, St. Louis, and other western points, at which points storage in transit is permitted by the western lines. (34 I. C. C., 267.)

Transit Rates on Logs and Staves at Alexandria, La.

Opinion by Commissioner Clark:

The commission finds that Morgan's Louisiana & Texas and the Louisiana Western have not justified a proposed withdrawal of their net transit rates on logs, rough staves and stave bolts when manufactured at points in Louisiana and reshipped via respondents' lines beyond the state. The carriers did not show that the present rates were unremunerative or that the resulting increased rates would be reasonable. (34 I. C. C., 169.)

Rates on Plaster from Grand Rapids

Grand Rapids Plaster Company v. Lake Shore & Michigan Southern et al. Opinion by Commissioner Hall:

The present carload rates and minimum carload weights on plaster and other gypsum products from Grand Rapids, Mich., to points in northern Illinois and southern Wisconsin are held to be discriminatory as compared with the rates and minimum weights on those commodities from Fort Dodge, Ia., and defendants are required to remove the discrimination. It is also held, however, that there is no discrimination against Grand Rapids and in favor of Fort Dodge in that defendants make deliveries of plaster and other gypsum products from both points to team and industrial tracks in the Chicago switching district. (34 I. C. C., 202.)

Rates on Flour from Inman, Kan.

Enns Milling Company v. Chicago, Rock Island & Pacific et al. Opinion by Commissioner Harlan:

The commission finds that the rates on flour, bran and shorts from Inman, Kan., to various destinations in southwestern Missouri are unreasonable, in that the difference between them and the rates prevailing under "higher Kansas City rate basis" is too great, this basis meaning in effect that the rates from Kansas grain fields to points in southwestern Missouri will be determined by the rates applicable to Kansas City, either from the Kansas grain fields or the southwestern Missouri destinations, whichever rates are higher. It is ordered that the rates be not in excess of 14½ cents on flour and 13 cents on bran and shorts, these rates being 1½ cents a 100 lb. higher than the rates prevailing under the "higher Kansas City rate basis." This case originally related also to a fourth section application, but the lower rates from Hutchinson and McPherson, Kan., having since been withdrawn, the Fourth Section application is denied. (34 I. C. C., 197.)

Imported Wood Pulp Rates from Boston, Mass.

Moore & Thompson Paper Company et al. v. Boston & Maine. Opinion by the commission:

The commission finds that the rates on imported wood pulp from Boston, Mass., to various New England points are not unreasonable or discriminatory. The allegation of discrimination was based on the fact that the rates on domestic pulp are less than the rates on the imported pulp. It was shown, however, that the rates on the domestic pulp from Boston to these points of destination were but paper rates. It was also shown that the imported pulp had a higher value per car because of a larger percentage of water contained in domestic pulp; that the expense of loading imported pulp is borne by the carrier, whereas domestic pulp is loaded by the shipper, and that the carriers have an inbound haul of the pulp wood used to manufacture domestic pulp which they do not have in the case of imported pulp. (34 I. C. C., 323.)

Furniture Rates from Grand Rapids

Furniture Manufacturers' Association of Grand Rapids v. Ann Arbor et al. Opinion by Commissioner Harlan:

The commission finds that the rates of $2.52 per 100 lb. on mixed carloads of furniture shipped from Grand Rapids, Mich., and of $2.45 from Rockford, Ill., to Pacific coast terminals are not unreasonable or discriminatory. The industry at Grand Rapids has become specialized; and no manufacturer undertakes to produce a complete line of furniture. To take care of this trade condition a practice has grown up of shipping mixed carloads of furniture from a number of factories intended for one consignee. The car may be loaded and shipped by a manufacturer at Grand Rapids, to whose warehouse the goods of other manufacturers are brought for that purpose, or the goods of several manufacturers may be sent for loading to the carloading department of the furniture and manufacturers' association. This association, which maintains assembling and loading facilities, is operated without profit and for the benefit of the furniture manufacturers of Grand Rapids and their customers. Goods are handled also for some of the factories located outside of Grand Rapids, such as Holland and Zeeland, and to these manufacturers a charge for the service of 10 cents per 100 lb. is made. In addition to mixed carloads, which, although billed to one consignee, may embrace goods for several consignees, many so-called pool cars, containing goods from several dealers intended for several consignees, are consigned to transfer companies, warehouses and distributing agencies on the coast. (34 I. C. C., 262.)

Charges for Disposal of Slag

In re charges for transportation and disposal of waste materials at Pittsburgh and other cities. Opinion by Commissioner Daniels:

Eleven carriers operating in Ohio, Pennsylvania and West Virginia have filed with the commission a tariff establishing a charge of 20 cents per net ton for the disposal of slag, flue dust, clean ashes or refuse molding sand, and a charge of 35 cents a net ton on ashes (mixed with other refuse), brickbats, dirt and other refuse material. The carriers have for a long time taken free all the slag which the mills gave them, for the reason that it furnished a useful material for the making of fills and for ballasting and sub-ballasting tracks. They still use large quantities of slag, but their construction work has so decreased, and the supply of slag given to them for disposal so increased, that the slag has become a burden to them, and they have even had to buy land on which to dump it.

The commission sees no reason why this disposal service should be performed gratuitously by the carriers. It appears, however, that the tariffs under consideration do not meet the requirements of section 6 of the act in that they do not designate the specific points at which disposal is made of the slag in question. The tariff should indicate that—

> the carriers will receive carloads of refuse on any industrial or private side track connected therewith, or on any main track, and will haul this refuse to some convenient point on its line or the line of a connecting carrier for wasting at a charge of .. cents per net ton—

The tariffs might also indicate whether or not a definite consignment and bill of lading should be made; in whom title of the slag vests; and when and where transfer of such title, if any, is effected. The tariffs as they stand at present do not conform with section 6 of the act and must be ordered cancelled.

Commissioner Hall dissents, noting that the carriage of the slag and other refuse lacks many of the attributes of transportation by a common carrier. (34 I. C. C., 337.)

New Mexico Class and Commodity Rates

State Corporation Commission of New Mexico v. Atchison, Topeka & Santa Fe et al. Opinion by Commissioner Clements:

Complaint is made against the reasonableness of the class and commodity rates into New Mexico from Kansas City, and all points on and east of the Missouri river, including St. Louis, Chicago and the great lakes region, to, but not including, eastern seaboard territory. The paramount issue arises under the fourth section, the principal violation being that rates from Kansas City, St. Louis and Chicago are lower to El Paso than to New Mexico points directly intermediate.

The contention that the El Paso rates are depressed by the action of the carriers in equalizing the rates to El Paso to the basis applied to Laredo and Eagle Pass in order that all these Rio Grande crossings may be placed on a parity in their competition with each other for traffic into Mexico, and the contention that low rates are demanded by the competition of the water-and-rail routes from the eastern seaboard and from Europe to consuming markets in Mexico via Tampico and Vera Cruz are not held by the commission to constitute sufficient grounds for fourth section relief at El Paso. It is held, however, that the competition of the water-and-rail routes from the markets of production on the eastern seaboard to El Paso via Galveston and other gulf ports does constitute a sufficient basis for relief as to commodity rates from Kansas City, St. Louis and Chicago in those cases in which the El Paso rates are thereby actually affected and de-

pressed below a reasonable basis. In Commodity Rates to Pacific Coast Terminals (32 I. C. C. 611) the carriers operating west from the Missouri river, in those cases in which they were compelled by the competition of the water lines from the eastern seaboard, were allowed to maintain a rate to the Pacific coast of not less than 75 cents a 100 lb., and to continue higher rates to intermediate points, provided the intermediate rate in no case exceeded 75 cents. It is held in this case that the maximum rate, below which relief should be granted, and which will in cases in which relief is granted be the maximum rate from Kansas City and St. Louis to intermediate points, should be 65 cents.

On those commodities on which the lowest rates from the Atlantic seaboard to El Paso are 65 cents or more no relief will be granted to the carriers operating from Kansas City and St. Louis to El Paso. As to those commodities on which the lowest rates from the eastern seaboard are less than 65 cents the carriers from Kansas City and St. Louis may meet those rates provided the intermediate rates do not exceed 65 cents. In those instances in which the lowest rates from the eastern seaboard to El Paso are less than 65 cents and the petitioners desire to maintain even lower rates from Kansas City and St. Louis to El Paso than apply from the eastern seaboard they may do so provided the intermediate rates do not exceed the rates to El Paso by more than the difference betwen the rates from New York to El Paso and 65 cents; the net result of this last being that by whatever amount the carriers voluntarily reduce the El Paso rates below what is required by the water-and-rail competition they must likewise reduce the intermediate rates below 65 cents. In all cases where relief is denied under the fourth section the carriers may correct the discrimination existing against intermediate points by increasing the rate to the more distant point; by decreasing the rates to the intermediate points; or by simultaneous increases and reductions.

The case also relates to the reasonableness of rates to intermediate points. It is found that the present class rates from Kansas City are in many cases unreasonable and a scale of maximum rates is prescribed, the first class rate being set at $1.55 to Tucumcari and Clovis; $1.70 to Roswell, Carlsbad, Vaughn, Pastura, Alamogordo, Las Vegas, Albuquerque, Santa Fe, Belen and Rincon; $2.00 to Deming; $2.10 to Silver City, and $2.25 to Gallup and Lordsburg, and other classes in proportion. The class rates to Raton are not found unreasonable. Maximum differentials ranging from 30 cents on first class to 8 cents on class E are prescribed over these Kansas City rates for shipments from St. Louis, and differentials ranging from 50 cents on first class and 13 cents on class E for shipments from Chicago.

Findings are made also relative to the commodity rates on the principal commodities moving into New Mexico. The rates on these commodities to Raton are not found unreasonable. Maximum rates are prescribed from Kansas City to Albuquerque as follows: Agricultural implements, 80 cents; beer, 65 cents; canned goods, 65 cents; emigrant movables, 55 cents; furniture, n. o. s., $1.19; packing-house products, 80 cents; building and roofing paper, 70 cents; cast-iron and wrought-iron pipe, 65 cents; stoves, 85 cents; sugar and sirup, 60 cents; wire and nails, 70 cents. It is held that the rates to Las Vegas, Santa Fe, Belen, Ricon, Roswell, Carlsbad, Pastura and Alamogordo should not exceed these rates. To Deming, Silver City, Gallup, Lordsburg and other points to which class rates are prescribed the commodity rates established shall bear the same relation to the commodity rates prescribed to Albuquerque as the class rates to those points bear to the class rates to Albuquerque. The commodity rates from St. Louis and Chicago to all New Mexico points must not exceed those from Kansas City by more than 10 cents and 20 cents a 100 lb. respectively. The commission does not attempt to deal with other commodity rates which may be established in the future nor does it attempt to prescribe reasonable commodity rates to points other than those to which rates are herein prescribed. The fourth section requirements will set the maximum rates to main-line points directly intermediate to those to which rates are herein fixed. To branch-line points the carriers will be expected to line up their rates in reasonable relation to the class and commodity rates.

The rate on hay from the Pecos Valley to Fort Worth and other points to which at present a 30-cent rate is effective must not exceed 28 cents in the future.

The present rates on lumber to Pecos Valley points are found unreasonable to the extent that they exceed 30 cents from Santa Fe mills in Texas and Louisiana, 33 cents from mills on connecting lines in Texas and 35 cents from mills on connecting lines in Louisiana and Arkansas.

The commission does not believe that the rates on traffic from the Pacific coast regions, including those on lumber and sugar, should be reduced. (34 I. C. C. 292.)

STATE COMMISSIONS

The West Virginia Public Service Commission, on application of the Baltimore & Ohio, has granted the road permission to accept coupons from mileage books which have been bought in other states on a basis of 2¼ cents a mile, provided the passenger proffers it in lieu of a ticket and is satisfied to pay the extra quarter cent. Persons living in other states coming into West Virginia frequently have tendered their mileage coupons instead of tickets, expressing the preference to pay the extra quarter cent rather than take the trouble to get a ticket at the West Virginia stations.

The New York State Public Service Commission, Second district, holds that it has not the power to permit a raise in passenger rates above a maximum set by the legislature. The decision is in the case of the Ulster & Delaware, which desired to increase its mileage book rate from two to three cents a mile. Chairman Vansantvoord wrote the opinion, which was concurred in by Commissioners Hodson and Irvine. In an extended review of all the statutory sections involved the opinion fails to find that the commission, either expressly or impliedly, has been granted such power. Commissioners Emmet and Carr dissented. Mr. Emmet held that, as the power to lower rates irrespective of legislative enactment is expressly granted by the Public Service Commission law, the power to raise rates is implied beyond reasonable doubt. The decision will probably be carried to the court of last resort.

COURT NEWS

Interstate Commerce in Intoxicating Liquors

In Rossi v. Pennsylvania, a case which arose before the passing of the Webb-Kenyon act of 1913, the United States Supreme Court holds that the Wilson act does not authorize the punishment of a liquor dealer in Ohio for soliciting orders for liquor in Lawrence County, Pennsylvania, where he had no liquor license, and delivering the goods there, since the Wilson act does not subject liquors transported in interstate commerce to state regulation until after their arrival at destination and delivery to consignee or purchaser.

Kansas Mutual Demurrage Law Held Void

The United States Supreme Court has declared invalid the Kansas "reciprocal" or "mutual" demurrage statute, providing that a railroad failing to furnish cars upon proper application shall pay to the party applying $5 a day damages, and all actual damages, with reasonable attorney fees, and that a shipper shall pay $5 a day for failure to load cars within 48 hours, for the reason that the act allows attorney's fees in favor of one class of litigants but not of the other, thus denying the latter the equal protection of the laws guaranteed by the Fourteenth Amendment. (Atchison, Topeka & Santa Fe v. Vosburg.)

State Statute Requiring Cars to Be Furnished Upheld

The United States Supreme Court affirms a decision of the Illinois Supreme Court (257 Ill., 80) awarding damages for the failure of the Illinois Central to furnish coal cars at the Mulberry Hill Coal Company's mine, located on the defendant's line, pursuant to the plaintiff's requirements and demands, as required by the Illinois act of 1874. The court approved the construction of the statute given by the state court, which was as follows: "The only requirement of the statute, as applied in this case or any other case, is, that the railroad corporation shall furnish cars, within a reasonable time after they are required, to transport the property offered for transportation, and what would be a reasonable time in any case would depend upon all the circumstances and conditions existing, including the requirements of the interstate commerce carried on by the corporation." It holds that the statute is not, as contended, a direct burden upon intertsate commerce, and therefore repugnant

to the commerce clause, irrespective of congressional action. Decided June 14.

Reduction of Coal Rate to Nashville—Discrimination in Switching

In an action against the L. & N., the Nashville, Chattanooga & St. Louis, the Tennessee Central, the Illinois Central and the Nashville Terminal, the United States Supreme Court has reduced the $1 rate on coal from Kentucky mines to Nashville to 80 cents. It based its finding on a comparison of the coal rates from the Kentucky mines to Nashville, Memphis and St. Louis, and of the Nashville coal earnings with those on all other traffic over the other roads entering that city. It also took into consideration that the carrying capacity of the cars had been much increased, resulting in a doubling of the earning capacity of fully loaded trains.

It also held that the practice of the companies to charge $3 a car for switching *non-competitive* business between industries within the terminal limits and in conjunction with the Tennessee Central was discriminatory. The plaintiff contended that the practice was designed to prevent the switching of coal between the Tennessee Central and private industries, located on sidings and reached through the terminals. Its effect was to furnish switching service to each other on *all* business, and to the Tennessee Central on all except coal and competitive business. The order of the commission requiring the companies to cease the discrimination and to maintain "a practice which will permit the interswitching of such shipments from and to the lines of each and every defendant" (including Tennessee Central) was sustained. What would be a proper practice and the charge therefor were matters not decided.

Government Loses Suit Against the Reading

In the United States court at Philadelphia, July 3, a decision by Judge McPherson was handed down to the effect that the Reading group of corporations, the Central Railroad of New Jersey, the Lehigh Coal & Navigation and subsidiary and allied companies, are not leagued together in an unlawful combination and therefore do not unduly restrain commerce in the production, sale or transportation of anthracite coal. The court, however, suggests that the Lehigh & Wilkes-Barre Coal Company be divorced from the Central of New Jersey. The Reading ownership of the Central is not disturbed. The court called attention to certain other objections of a minor nature, which, however, did not affect the general decision.

The decision holds that there was no violation by the Reading companies of the commodities clause of the Interstate Commerce law.

The decision refused to declare that the Reading company, the Philadelphia & Reading Railway and the Philadelphia & Reading Coal and Iron Company were, either separately or individually, a combination in violation of the anti-trust law.

The court expressed regret at the delay in the decision of the case, giving as a reason the necessity of awaiting the decision of the Supreme Court in the government's suit against the Lackawanna. The decision was concurred in by Judges Buffington and Hunt.

The court finds that the evidence does not support the charge that the transportation of anthracite at the rates now and for a long time past in force has been enormously profitable.

As to the commodities clause, the court finds that under the facts presented in the Reading case the question is not decided by the recent decision in the Lackawanna case, which rests entirely on the construction of a certain agreement that was there attacked. After reviewing the evidence upon this subject the court decides that the commodities clause has not been violated by the Reading companies.

It is expected that the government will appeal the case.

Approval of Leases by Public Utility Commission

In refusing a writ of mandamus to the West Jersey & Seashore to compel the New Jersey board of public utility commissioners to approve a lease proposed to be made by the company of its railroad and franchises to the Pennsylvania, the New Jersey Court of Errors and Appeals, affirming the decision of the Supreme Court, 85 N. J., Law 468, holds that the primary purpose of the requirement in the public utilities act, in regard to proposed leases is to provide a method for preventing the making of leases embracing provisions inimical to the interests of the state or omitting provisions which are requisite for the protection of those interests. The power of approval or refusal to approve conferred upon the board is discretionary in its character; and, this being so, the Supreme Court cannot substitute its own judgment for that of the board and compel it by mandamus to grant or withhold its approval. West Jersey & Seashore v. Board (N. J.), 94 Atl.. 57.

Injuries to Animals on Track

In an action for the killing of a mule struck by a train, it is held by the Mississippi Supreme Court that the failure of the company to equip the locomotive with an electric headlight, as required by law, did not make the company liable, it not being shown that the presence of such a headlight would have prevented the mule from running in front of the fast moving train 30 or 40 ft. ahead of the engine, as appeared to have been the case. Illinois Central v. Calhoun (Miss.), 68 So., 442.

Damages for Blocking View by Embankment Not Recoverable

Damages were sought, under the Massachusetts statute providing that all damages caused by laying out, making and maintaining a railroad, or by taking land or materials therefor, may be recovered, for injury resulting from the cutting off of the plaintiff's view from his property by the location of a railroad embankment in front of it. The embankment was beyond a public way and intervening property of other owners, about 150 ft. away, and about the same height as the plaintiff's door, and did not in any way interfere with his light or air or access to the highway. It was held that the interference with the view from the plaintiff's house and estate, which was the sole ground on which damages were sought, related to matters too remote and speculative, and was not sufficiently special and peculiar to the plaintiff to warrant a recovery. No decision, so far as the court was aware, has ever gone so far as to hold that damages might be recovered for invasion of purely aesthetic elements of value. Howell v. New Haven (Mass.), 108 N. E., 934.

Adequate Return—Intrastate Commerce—"Unreasonable" and "Confiscatory" Rates

In deciding that a rate on slack, nut, and pea coal from Pittsburg, Kan., to Concordia, Kan., composed by adding the Kansas local distance rate of 20 cents a ton from Abilene to Concordia to the carrier's voluntary rate of $1 from Pittsburg to Abilene, and involving only intrastate commerce, is not unreasonable, unjust, or oppressive, the Kansas Supreme Court cited the three recent cases of Northern Pacific v. North Dakota and Minneapolis, St. P. & S. S. M. v. North Dakota, 236 U. S. 585; and Norfolk & Western v. West Virginia, 236 U. S. 605, all decided March 8, 1915, on the subject of adequate rates. In the first of these, Mr. Justice Hughes says: "Frequently, attacks upon state rates have raised the question as to the profitableness of the entire intrastate business under the state's business requirements. But the decisions in this class of cases furnish no ground for saying that the state may set apart a commodity or a special class of traffic and impose upon it any rate it pleases, provided only that the return from the entire intrastate business is adequate." The Kansas court says that it is too soon to say how far-reaching these decisions may be, but that the new doctrine is no doubt controlling; and whatever has been said in decisions and textbooks to the effect that a state or a state commission could establish a rate not in itself compensatory, provided the mass of state rates was profitable, may as well be discarded.

The court also sustained the railroads' contention that the word "unreasonble" in the statute is not synonymous with "confiscatory." A rate may not be confiscatory, and yet be inequitable in that it does not yield a fair compensation, which would include cost of moving the traffic, wear and tear of tracks and equipment, and a fair profit for the service rendered. This is also the view of the Texas courts on a statute much like the Kansas one. Union Pacific v. Public Utilities Commission (Kan.), 148 Pac. 667.

Railway Officers

Executive, Financial, Legal and Accounting

A. C. Hamilton, vice-president and general counsel of the Texas-Mexican at Laredo, Tex., has resigned.

F. S. Wynn, secretary of the Southern Railway at New York has been elected secretary also of the Mobile & Ohio, succeeding A. W. Mackintosh, resigned.

S. S. Russell, special agent of the auditing department of the Central Vermont at St. Albans, Vt., has been appointed claim agent, with office at St. Albans, and the office of special agent has been abolished.

F. W. Kirtland, freight traffic manager of the Florida East Coast at St. Augustine, Fla., has been appointed assistant to vice-president, with headquarters at St. Augustine, and the position of freight traffic manager has been abolished.

The following officers of the Morris & Essex were elected recently: Adrian H. Larkin, chairman of the board; J. O. H. Pitney, of Newark, N. J., president; E. E. Loomis, vice-president; Henry V. Poor, secretary; E. C. Stanley, Jr., assistant secretary; R. B. Schofield, treasurer, and W. D. Dunley, assistant treasurer.

The officers of the Monongahela Railway recently formed by the consolidation of the Monogahela Railroad and the Buckhannon & Northern are as follows: J. M. Schoonmaker, president, Pittsburgh, Pa.; J. J. Turner, vice-president, Pittsburgh; Lewis Neilson, secretary, Philadelphia; T. H. B. McKnight, treasurer, Pittsburgh; C. K. Elder, auditor, Brownsville; G. B. Obey, general superintendent, Brownsville; D. K. Orr, chief engineer, Brownsville, and J. C. Grooms, real estate agent, Pittsburgh.

Operating

F. N. Hibbits, superintendent of motive power of the Lehigh Valley at South Bethlehem, Pa., has resigned to go to the Baldwin Locomotive Works.

J. H. Owen, transportation clerk of the Florida East Coast at St. Augustine, Fla., has been appointed superintendent of transportation, with headquarters at St. Augustine.

G. B. Obey, superintendent of the Monongahela Railroad has been appointed general superintendent of the Monongahela Railway which was formed recently by the consolidation of the Monongahela Railroad and the Buckhannon & Northern. Mr. Obey entered the service of the Pittsburgh & Lake Erie as a train despatcher in 1889, and in 1899 was promoted to chief train despatcher. Two years later he was appointed superintendent of the Youghiogheny and Monongahela divisions of the same road, with headquarters at Pittsburgh, Pa. In 1905, he left the service of the Pittsburgh & Lake Erie to become superintendent of the Monongahela Railroad, with office at Brownsville, Pa., which position he held at the time of his recent appointment as general superintendent of the Monongahela Railway, with headquarters at Brownsville, as above noted.

G. B. Obey

D. S. Farley, superintendent of the Kansas City division of the Atchison, Topeka & Santa Fe at Kansas City, Mo., has been transferred to Amarillo, Tex. C. L. Mason, trainmaster of the eastern division at Emporia, Kan., has been appointed superintendent at Kansas City, Mo., succeeding Mr. Farley. H. R. Lake has been appointed trainmaster at Emporia, Kan., succeeding Mr. Mason.

Edward T. Whiter, whose appointment as assistant general manager of the Pennsylvania Lines West of Pittsburgh, with headquarters at Pittsburgh, Pa., has already been announced in these columns, was born at Steubenville, Ohio, on March 26, 1864. He was educated in the public schools of that place and entered railway service on March 1, 1881, with the Pennsylvania, as telegraph operator, and served consecutively as train despatcher, assistant trainmaster and trainmaster until January 1, 1903, on which date he was appointed superintendent of the Eastern division. On January 1, 1913, he was appointed general superintendent of the Northwest system, from which position he is now promoted to assistant general manager of the Pennsylvania Lines West of Pittsburgh. Mr. Whiter's entire career has been with the Pennsylvania.

E. T. Whiter

Isaac Wheeler Geer, whose appointment as general superintendent of the Central system of the Pennsylvania Lines West of Pittsburgh, with headquarters at Toledo, Ohio, has been announced, was born at Plainfield, Conn., on February 1, 1873. He was graduated from Yale university in June, 1895, and entered railway service as rodman with the Pennsylvania in September of the same year. In November, 1897, he was transferred to the maintenance of way department of the Erie and Ashtabula division as assistant on the engineer corps. In February, 1898, he was promoted to assistant engineer, and in March, 1900, was made engineer of maintenance of way on the same division. He was then transferred to the Pittsburgh division in the same capacity in December, 1902, in which position he remained until January, 1904, when he was appointed superintendent of the Terre Haute & Logansport and the Logansport & Toledo railways, which were at that time affiliated with the Pennsylvania Lines. In November, 1906, he was transferred to the Logansport division, and in January, 1913, he was transferred to the Cleveland & Pittsburgh division from which position he is now promoted.

I. W. Geer

Samuel B. Robertson, superintendent of the Erie and Ashtabula division of the Pennsylvania Lines West of Pittsburgh, at Newcastle, Pa., has been transferred in the same capacity to the Cleveland and Pittsburgh division, with headquarters at Cleve-

land, Ohio, succeeding I. W. Geer, promoted. W. M. Wardrop, superintendent of the Western division, at Ft. Wayne, Ind., succeeds Mr. Robertson. Otto Schroll, superintendent of the Toledo division, with headquarters at Toledo, Ohio, succeeds Mr. Wardrop. Paul Jones, superintendent of the Zanesville division, with headquarters at Zanesville, Ohio, succeeds Mr. Schroll. F. J. Stimson, division engineer of the Grand Rapids & Indiana, has been appointed superintendent at Zanesville, Ohio, succeeding Mr. Jones.

Traffic

Thomas E. Bond has been appointed chief of the tariff bureau of the Elgin, Joliet & Eatsern, with headquarters at Chicago.

Charles E. Brown has been appointed commercial agent of the Cleveland, Cincinnati, Chicago & St. Louis, at Los Angeles, Cal., and J. X. Kimberger has been appointed commercial agent at Seattle, Wash.

F. B. Humston, district passenger agent of the Chicago, Indianapolis & Louisville, at Indianapolis, Ind., has been appointed division freight agent, with headquarters at Indianapolis. Frank V. Martin, city passenger agent at Indianapolis, succeeds Mr. Humston. A. J. O'Reilly, general agent at Indianapolis has retired from active service because of ill health, but will be retained by the company in an advisory capacity.

R. A. Ebe, assistant general livestock agent of the Baltimore & Ohio at Pittsburgh, Pa., has been appointed general livestock agent, succeeding the late Ben Wilson, and the position of assistant general livestock agent has been abolished. W. J. O'Toole, secretary to the general livestock agent has been appointed assistant to general livestock agent; F. Fowler, division freight agent at Parkersburg, W. Va., has been appointed assistant to general freight agent, both with headquarters at Baltimore, Md., and H. H. Marsh, commercial freight agent at Wheeling, W. Va., has been appointed division freight agent, with office at Parkersburg.

Engineering and Rolling Stock

W. H. Oliver, division engineer of the Atchison, Topeka & Santa Fe, at Needles, Cal., has been transferred in the same capacity to San Bernardino, Cal.

C. E. Brooks, acting superintendent of motive power of the Grand Trunk Pacific at Transcona, Man., advises that J. F. Moffatt has not been appointed locomotive foreman as had been announced in circular No. 50, which was noticed in this column on July 2.

OBITUARY

Frank H. Chamberlain, claims adjuster for the Atchison, Topeka & Santa Fe, with headquarters at Guthrie, Okla., died at Battle Creek, Mich., on June 21.

Samuel Thorne, a director of the Great Northern, the Colorado & Southern and other Hill roads, died on July 5, of heart disease, on board the yacht of James J. Hill of the Great Northern, on the St. John's river, Quebec, Canada.

Charles L. Haydock, assistant engineer of the Missouri Pacific, at St. Louis, Mo., was drowned recently at Leavenworth Junction, Kan., while superintending the making of willow mattresses to prevent the river from undermining the tracks. He was 31 years old.

GERMAN RAILWAYMEN JOIN THE COLORS.—A report from Holland says that 400,000 German railwaymen will shortly be called to the colors. In order to replace the men a great number of women are now being instructed in railway work.

RAILWAY EXTENSION IN CHILE.—The directors of the government railways have decided to build a branch connecting the Longitudinal Railway with the port of Iquique; the estimated expenditure is $110,000. It will be necessary for this money to be secured from the profits of one of the railways or included in the budget for the coming year. The only railway actually producing net earnings at the present time is the Arica-La Paz. The government railways are preparing plans for the repair of roads that lead to the railway stations along the Central Railway at an estimated expenditure of $282,000.

Equipment and Supplies

LOCOMOTIVE BUILDING

THE MISSOURI, OKLAHOMA & GULF is figuring on 6 Mikado type locomotives.

THE EUREKA NEVADA has ordered one Prairie type locomotive from the H. K. Porter Company.

RUSSIAN GOVERNMENT.—The H. K. Porter Co. is said to be working on 22 72-ton and 11 67-ton locomotives for the Russian government. This item has not been confirmed.

THE TEXAS & PACIFIC, reported in the *Railway Age Gazette* of May 28 as being in the market for 10 switching and 6 freight locomotives, is also reported to be in the market for 6 passenger locomotives.

THE RICHMOND, FREDERICKSBURG & POTOMAC has issued inquiries for 6 superheater Pacific type locomotives, to have 26 by 28 in. cylinders, a tractive effort of 47,000 lb. and a total weight of 285,000 lb.

THE DETROIT, TOLEDO & IRONTON has ordered 2 Consolidation type locomotives from the American Locomotive Company. These locomotives will have 21 by 28 in. cylinders, 56-in. driving wheels and a total weight of 106,000 lb.

THE MONTOUR RAILROAD has ordered 3 superheater Mikado type locomotives from the American Locomotive Company. These locomotives will have 27 by 32 in. cylinders, 57-in. driving wheels, and a total weight of 325,000 lb.

CAR BUILDING

THE LEHIGH VALLEY has ordered 20 milk cars from the Standard Steel Car Company.

THE CHICAGO GREAT WESTERN is reported to be in the market for 1,500 steel underframes.

THE DETROIT, TOLEDO & IRONTON has ordered 200 box cars from the American Car & Foundry Company.

THE BALTIMORE & OHIO is reported to be in the market for 2,000 hopper cars. This item has not been confirmed.

THE TEXAS & PACIFIC, which was reported in an unconfirmed item in the *Railway Age Gazette*, June 4, as inquiring for 500 coal cars, is in the market for 400 50-ton gondola cars.

THE HAVANA CENTRAL, which was reported in the *Railway Age Gazette* of May 28, as inquiring for 660 freight cars, is reported to have ordered these cars from the Standard Steel Car Company. This item has not been confirmed.

THE BRITISH GOVERNMENT was reported in the *Railway Age Gazette* of June 25 as having given the Canadian Car & Foundry Company a large order for box cars. It is now said that this order includes 1,200 Belgian type steel frame box cars, 24 ft. in length and of 26 ton capacity.

THE RUSSIAN GOVERNMENT was reported in the *Railway Age Gazette* of May 21 as having placed orders for 22,000 cars as follows: Pressed Steel Car Company, 7,000; Seattle Car & Foundry Company, 7,000; Eastern Car Company, New Glasgow, N. S., 2,000; Nova Scotia Car Company, Halifax, N. S., 2,000; American Car & Foundry Company, 2,000, and Canadian Car & Foundry Company, 2,000. On some of these orders the car builders and the Russian government were at first unable to agree as to the terms of payment. Contracts have now been definitely closed, however, for the following orders: Pressed Steel Car Company, 4,800 50-ton coal cars (the Russian government having the option of increasing this to 5,000 if desired) and 2,000 40-ton box cars; Eastern Car Company, 2,000 40-ton box cars, and the American Car & Foundry Company, 4,100 box cars, a total with these three

companies of 12,900 cars. The Seattle Car & Foundry Company has an order, or is negotiating for 8,500 four-wheel freight cars. Orders for 2,000 cars remain to be placed, the Nova Scotia Car Company having rejected its order.

IRON AND STEEL

THE GREAT NORTHERN has ordered 125 tons of steel for seven track scales from the American Bridge Company.

THE SAN PEDRO, LOS ANGELES & SALT LAKE has ordered 8,000 tons of rails from the Colorado Fuel & Iron Company.

THE ATCHISON, TOPEKA & SANTA FE has ordered 375 tons of steel from the American Bridge Company for an elevator at Argentine, Kan.

THE AMERICAN CAR & FOUNDRY COMPANY has ordered 322 tons of steel from the American Bridge Company for a yard crane runway and a car shop addition at Chicago.

THE CHICAGO, ROCK ISLAND & PACIFIC has ordered 17,000 tons of rails from the Illinois Steel Company, and 3,000 tons from the Algoma Steel Corporation. The rails will all be 100 lb.

THE NEW YORK PUBLIC SERVICE COMMISSION, First district, has awarded a general contract to the Newman & Carey Company, for 6,400 tons of steel for Section No. 1 of the Nostrand avenue subway, Brooklyn.

MACHINERY AND TOOLS

THE YAZOO SOUTHWESTERN, Walter C. Murphy, president, Yazoo City, Miss., is reported in the market for repair and machine shop equipment.

SIGNALING

The Public Utilities Commission of Ohio has ordered the installation of interlocking signals in Lima, at the crossing of the Pennsylvania Lines, the Cincinnati, Hamilton & Dayton and the Lake Erie & Western. The work is to be done by the Pennsylvania and shares of the cost charged to the other companies in proportion to the functions installed on the tracks of each company. The commission orders that the cost of operation shall be allotted, fifty per cent to the Pennsylvania and fifty to the other two roads; but when the two roads last named shall have separated their interests then each of the three roads is to pay one-third of the whole. The installation must be finished by October 1.

GERMAN SOUTH-WEST AFRICA RAILWAYS.—The damaged railway lines in German South-West Africa occupied by the Union forces are so far restored that through communications has been established between Lüderitzbucht and Karibib. An extension of the Upington line to Kalkfontein, north of Warmbad, is expected at an early date, thus linking up the German lines with the Union system.

RAILWAY IN YUNNAN PROVINCE OF CHINA.—Renewed activity is reported in regard to a railway from Mengtze, Yunnan Province, China, to the Ko-chiu tin mintes. The Chinese capitalists concerned in the tin mines and in the railway undertaking have recently employed two French engineers in connection with the enterprise. The original plans and the actual location of the line were made by American engineers, who resigned several months ago because of the prospect at that time that nothing definite was likely to be accomplished because of unrest and uncertainty in China and later because of war conditions in Europe. The plans call for 60-centimeter (23.6 in.) gage track, and the rolling stock needed is estimated at 8 locomotives, 100 freight cars and 15 passenger cars. French interests are said to have an immense advantage in obtaining this business, not only because of the dominance of French interests in the district and the influence of French engineers, but also because of the discriminating duties on goods coming into China from Indo-China and into the latter from France and because of favors extended French interests by the railway from Indo-China to Yunnan fu.

Supply Trade News

The Schroeder Headlight Company, Evansville, Ind., is reported to have an order from the Russian government for 400 headlights.

The Scullin-Gallagher Iron & Steel Company, St. Louis, Mo., by a vote of its stockholders has changed its name to the Scullin Steel Company.

The American Brake Shoe & Foundry Company has secured an order for 52,000 brake shoes for the cars which the Pressed Steel Car Company is now building for the Russian government.

The American Steel Export Company was incorporated in Delaware on June 29, with a capital of $200,000, to promote the sale abroad of products of the Cambria Steel Company.

Thomas R. Cook, formerly assistant engineer of motive power of the Pennsylvania Lines West, has been appointed chief engineer of the Willard Storage Battery Company, Cleveland, Ohio.

D. P. Lamoreux has been appointed to take charge of the railway and car material department of the Johnson Lumber Company, Milwaukee, Wis., with headquarters in the McCormick building, Chicago.

W. L. Jefferies, Jr., has been appointed representative of the Union Spring & Manufacturing Company, New Kensington, Pa., with office in the Mutual building, Richmond, Va., succeeding W. F. La Bonta, deceased.

The Condit Electrical Manufacturing Company, Boston, Mass., and the Luminous Unit Company, St. Louis, Mo., will hereafter, by arrangement with the Thomas G. Grier Co., Chicago, be represented exclusively by the Electrical Sales Engineers, Inc., Chicago. This is a new company with the following officers: Paul W. Koch, president and general manager; Fred B. Duncan, vice-president, and Alfred O. Dicker, secretary and treasurer. Mr. Koch was formerly manager of the Thomas G. Grier Co; Mr. Duncan, formerly sales engineer of the George Cutter Co., South Bend, Ind., and Mr. Dicker was formerly illuminating engineer of the Commonwealth Edison Company, Chicago.

Fairbanks, Morse & Company, New York, have acquired the business of the Neil Machinery Company, and will take over the following agencies heretofore controlled by the latter: Lees Bradner Company, Cleveland, Ohio; Kern Machine Tool Company, Hamilton, Ohio; Springfield Machine Tool Company, Springfield, Ohio; Colburn Machine Tool Company, Franklin, Pa., and Bridgeford Machine Tool Company, Rochester, N. Y. George E. Neil, formerly manager of the Neil Machinery Company, has been appointed manager of the machine tool department of the New York office of Fairbanks, Morse & Company, and W. V. Gould, for many years with the Jones & Lamson Machine Company, Springfield, Vt., has also become associated with that department.

The Westinghouse Electric & Manufacturing Company plan has been declared operative. Stockholders of record July 17 will have the privilege of subscribing for new convertible 5 per cent bonds at 105 in a ratio of 45 per cent of the holdings of stock. The first payment on the new bonds will be $250 for $1,000 bond on August 13, the other payment being $820.83 on December 1. The second payment includes an adjustment of interest. The new issue of bonds will be convertible into common stock at par up to December 31, 1916. If all the new issue of bonds is subscribed for by stockholders, the proceeds will be used to retire the existing issue of bonds at 105. If only a portion of the bonds are subscribed for by stockholders, the old issue will be paid off to the extent of the new money received and the new convertibles exchanged for the balance. If none of the new bonds are subscribed for, they will be exchanged for the old issue recently deposited with the Guaranty Trust Company.

The American Car & Foundry Company

The earnings of the American Car & Foundry Company in the fiscal year ending April 30, 1915, were $3,615,054. From this there was deducted $1,284,118 for renewals, replacements, re-

pairs, new patterns, etc., leaving net earnings of $2,330,936. Dividends of $2,100,000 (7 per cent) were paid on preferred stock, and of $600,000 (2 per cent) on common stock, making a total of $2,700,000. The total surplus on April 30 was $25,694,076. The general balance sheet of the company on April 30 was as follows:

ASSETS.

Property and plant account:	
Cost to April 30, 1914	$66,108,223
Additions to plants during year	57,424
Reservation for steel car plants	616,886
Materials on hand	4,974,004
Current assets:	
Accounts and notes receivable	11,587,622
Stocks and bonds of other companies	847,711
Bank certificates of deposit	3,500,000
Cash	3,659,855
	$91,351,725

LIABILITIES.

Preferred stock	$30,000,000
Common stock	30,000,000
Current liabilities:	
Audited vouchers and payrolls	2,569,948
Dividends (payable July 1)	675,000
Reserve accounts	2,412,701
Surplus	25,694,076
	$91,351,725

TRADE PUBLICATIONS

WELLS, FARGO & COMPANY.—This company has issued a booklet of 44 pages, giving a large amount of information as to how to reach the various points of interest in San Francisco in connection with the Panama-Pacific Exposition.

HEADLIGHTS.—The Esterline Company, Indianapolis, Ind., has recently issued catalog 364, descriptive of Golden Glow incandescent headlights. These headlights are very largely used on street car and interurban railway lines, and in steam and electric locomotive service.

STEEL POLES.—The Carbo Steel Post Company, Chicago, has issued a 20-page booklet describing Carbo steel poles for telephone, telegraph and signal lines. The booklet is illustrated with several typical designs of these poles, and contains considerable data regarding their construction and capacity.

COAL STORAGE SYSTEM.—Bulletin No. 221 recently issued by the Link-Belt Company, Chicago, is a four-page leaflet descriptive of the Link-Belt patented circular storage system. The leaflet describes the system in detail, names its several advantages and contains illustrations of typical installations.

WOOD BLOCK FLOORS.—The Ayer & Lord Tie Company, Chicago, has recently issued a booklet on that company's interior creosoted wood block floors. The booklet discusses the several advantages of this type of flooring material and contains several illustrations of wood block floors laid in different kinds of shops.

GAS ENGINES.—Bulletin No. 34-X, issued by the Chicago Pneumatic Tool Company, Chicago, is devoted to the Class A-G "Giant" gas and gasoline engines made by that company. Bulletin No. 34-U contains instructions for installing and operating "Chicago Pneumatic" Class N-SO fuel oil driven compressors.

AIR COMPRESSORS.—Form No. 3,031, recently issued by the Ingersoll-Rand Company, New York, is devoted to the Ingersoll-Rogler Class FR-1 steam driven single stage straight line air compressors sold by that company. The company has also recently issued Form No. 4,034, relative to the Leyner-Ingersoll water drill.

OXYGEN.—In a pamphlet entitled "Production of Pure Oxygen and Hydrogen," the International Oxygen Company, Newark, N. J., gives a description of its system of producing oxygen by water electrolysis. Several installations of this system are illustrated. The purity of the gases produced by this method is shown to be especially high.

SPECIFICATIONS FOR TELEGRAPH POLES.—The W. F. Goltra Tie Company, Cleveland, has issued a booklet containing general information and specifications for chestnut and cedar poles for telegraph, telephone and electric light lines. This book also contains a considerable amount of information regarding the weights, original costs and costs of setting poles of various timbers and lengths.

Railway Construction

ALABAMA GREAT SOUTHERN.—New second main track between York, Ala., and Cuba, 6.5 miles, was placed in service July 1, on the Alabama Great Southern, providing with the exception of a single track gauntlet between Toomsuba and Russell, Miss., of seven miles, continuous double track from York to Meridian, Miss., all of recent construction. This track is used jointly by trains of the Alabama Great Southern and the Southern Railway.

BUFFALO, LOCKPORT & ROCHESTER.—See Rochester Connecting.

CHERRY RIVER & SOUTHERN.—An officer writes that this company already has considerable of the right-of-way bought, and in about 90 days expects to secure through condemnation proceedings the right-of-way through the Gauley Coal Land Company on about 23.5 miles. The projected route is from a point on the Baltimore & Ohio at the mouth of Cherry river, where it flows into Gauley river at Curtin, Nicholas county, W. Va., thence down the south side of Gauley river, via Brooks Bridge to the mouth of Hominy creek, thence up Hominy creek to the mouth of Mouse creek, and up Mouse creek to its head waters, passing through Shawver's Gap to Eleven Mile branch of Angling creek and down Eleven Mile branch and Angling creek to Meadow river, thence up the east or north side of Meadow river to the Nicholas, Greenbrier and Fayette county lines, about 42.5 miles. Construction work will be started as soon as the right-of-way is secured. The maximum grades will be 3 per cent compensated down to 1½ per cent, and the maximum curvature will be 30 deg. There will be three steel bridges on the line; two of 400 ft. each, and one of 125 ft. The company expects to develop a traffic in lumber, timber products, coal and other general commodities. H. L. Kirtley, president; E. H. Venable, chief engineer, Charleston, W. Va.

EAST GEORGIA (Electric).—A charter has been granted this company in Georgia with $212,000 capital and headquarters at Savannah. The plans call for building an interurban electric or steam railway from Glenville, Ga., north via Hagan to Adabelle, about 30 miles, with a short branch from Hagan to Claxton. H. P. Talmage, G. J. Baldwin and E. Leffler are incorporators. (April 1, p. 811.)

LINVILLE RIVER.—A contract has been given to W. S. Whiting, Elizabethton, Tenn., to build a branch from Montezuma, N. C., northeast to Fascoe, 12 miles. The company now operates a line from Pineola northwest via Montezuma to Cranberry, 14 miles.

RADFORD-WILLIS SOUTHERN.—A contract is reported let to the Williams Brothers Construction Company, Roanoke, Va., for building from Radford, Va., southeast along Little river and Indian creek to Willis, about 25 miles. J. L. Vaughan, president; W. L. Castle, secretary and assistant treasurer. (February 26, p. 390.)

ROCHESTER CONNECTING.—Application has been made to the New York Public Service Commission, Second district, for a certificate of public convenience and necessity to build 2.5 miles of line in the outskirts of Rochester, N. Y. The Rochester Connecting recites in its petition its connection with the Buffalo, Lockport & Rochester, which now operates an electric line, and is also interested in the proposal to build a new international bridge across the Niagara river and to connect it with the B. L. & R. by a new line from Niagara Falls to Lockport. The eastern end of the B. L. & R., through the proposed Rochester Connecting is to be connected with the Pennsylvania and Erie systems at Rochester. The project is backed by electrical traction men of western New York, including E. G. Connette, president of the International Railway, Buffalo.

TENNESSEE RAILWAY.—A contract is reported let to J. C. Rodes & Company, Franklin, Tenn., for work on an extension of 11 miles towards Petros. On the completion of this contract there will remain about five miles yet to be built to complete the line from Oneida to Petros.

Railway Financial News

Buckhannon & Northern.—See Monongahela Railway.

Chicago, Rock Island & Pacific.—N. L. Amster has filed a supplementary or amended petition for intervention covering all of Federal Judge Carpenter's recent orders in the Chicago, Rock Island Pacific receivership.

Delaware, Lackawanna & Western.—An independent board of directors has been elected by the stockholders of the Morris & Essex, which is leased to the Delaware, Lackawanna & Western and which heretofore had a board of directors composed of officers or directors of the Lackawanna. J. O. H. Pitney, of Newark, has been made president; Adrian H. Larkin, chairman of the board; E. E. Loomis remains vice-president, and Henry V. Poor has been made secretary. The executive committee consists of Mr. Larkin, John R. Hardin, George C. Van Tuyl, Jr., Dunlevey Milbank and J. O. H. Pitney.

The following announcement has been made in regard to the steps that have been taken to comply with the Supreme Court's decision in the commodities clause case, commented on editorially in the *Railway Age Gazette* last week.

"Steps were taken to comply promptly with the recent rulings of the United States Supreme Court.

"The board authorized the officers of the company to execute a new contract which should conform to all matters questioned by the Supreme Court as either illegal or objectionable.

"The only directors of the coal company who are directors of the railroad, namely: W. H. Truesdale and George F. Baker, Jr., resigned from the board, and C. D. Norton and T. J. Mumford were elected in their places.

"E. E. Loomis, president of the coal company, tendered to the board his resignation to be accepted as soon as his successor can be selected, and arrangements were made to procure separate office accommodations without delay."

An extra dividend of 50 per cent has been declared by the Delaware, Lackawanna & Western Coal Company.

El Paso & Southwestern.—The Arizona Corporation Commission has approved the issue of $16,000,000 bonds, the proceeds to be used to buy new equipment and make additions and betterments and to provide for refunding. All the lines belonging to the company in Arizona, some of which now are not operated directly, will be merged and brought under one operating organization.

Kansas City, Mexico & Orient.—The three receivers who were appointed in 1912 have been formally discharged. The operation of the property was taken over about a year ago by a new company.

Missouri Pacific.—The plan of readjustment without receivership which three committees, representing the 5 per cent first and refunding mortgage bonds, the 40-year 4 per cent gold loan bonds and the Missouri Pacific stock respectively, have been working on, was announced on Wednesday afternoon. Kuhn, Loeb & Co., New York, are made readjustment managers. The plan calls for the raising of $41,419,792 cash through the subscription by stockholders of $50 cash for each share of Missouri Pacific stock held. This $41,419,792 cash is to be used to pay the $24,845,000 notes which were due June 1 and were extended for one year, to pay $3,861,000 maturing equipment trust obligations of the Missouri Pacific and of the St. Louis, Iron Mountain & Southern, and to pay floating indebtedness, interest, some immediately needed improvements, and to provide working capital. Common stockholders are to receive in exchange for each $50 cash and the share of stock given up $50 in new general mortgage 4 per cent bonds and $100 in new common stock. Underlying mortgages with bonds outstanding aggregating $128,460,620 are to remain undisturbed. There are to be issued the $82,839,585 new common stock—just sufficient to make the payment to old stockholders mentioned above; $46,923,150 new first and refunding mortgage 5 per cent bonds; $44,399,292 new general mortgage 4 per cent bonds, of which, as mentioned above, $41,419,792 will go to stockholders in exchange for the cash and the remainder will be used, as noted below, in exchange for outstanding bonds; $76,751,635 new convertible 5 per cent preferred stock, cumulative after June 30, 1918, and convertible into common stock at par. The holders of the $14,904,000 consolidated first mortgage 6 per cent bonds will be asked to accept in exchange $16,394,400 (110 per cent) new first and refunding mortgage 5 per cent bonds; holders of the $14,375,000 collateral trust 5 per cent bonds, due 1917, will be asked to accept $14,375,000 new first and refunding 5's in exchange, and holders of the outstanding $9,636,000 collateral trust 5 per cent bonds, due 1920, will be asked to accept $9,636,000 new first and refunding mortgage 5 per cent bonds in exchange. Holders of the $37,255,000 gold loan 4 per cent bonds will be asked to accept a like amount of new 5 per cent preferred stock, as will also the holders of $29,806,000 first and refunding 5's and $650,000 outstanding Lexington division 5's in exchange. Holders of the $3,459,000 Central branch 4 per cent bonds and of the $2,500,000 Central branch Union Pacific 4 per cent bonds will be asked to accept half of the face value of their bonds in new general mortgage 4 per cent bonds and the other half in new 5 per cent preferred stock. Holders of the $520,000 Leroy & Caney Valley first 5's, of the $1,024,000 Kansas City Northwestern 5's and of the $500,000 Boonville, St. Louis & Southern 5 per cent bonds are asked to take a like amount of new preferred stock in exchange. Holders of the St. Louis, Iron Mountain & Southern $4,175,000 first and refunding mortgage 6 per cent bonds are asked to take $4,383,750 (105 per cent) in new first and refunding mortgage 5 per cent bonds, and the holders of $393,000 Little Rock Junction first consolidated 6's guaranteed by the Iron Mountain, and of the $1,741,000 Texas & Pacific notes endorsed by the Iron Mountain, are asked to take a like amount of new first and refunding 5's. Holders of the few thousand dollars ($45,135) outstanding St. Louis, Iron Mountain & Southern stock are asked to take a like amount of new preferred. This plan reduces the interest bearing securities outstanding by $60,552,558, or from $39,996 per mile to $31,357. On the basis of the earnings and expenses for the fiscal year ended June 30, 1915 (last two months estimated) there should be a balance of $2,373,514. After the payment of all fixed charges this would amount to 3 per cent on the new preferred stock.

Monongahela Railroad.—See Monongahela Railway.

Monongahela Railway.—The Monongahela Railroad and the Buckhannon & Northern have been consolidated and taken over by a new company, the Monongahela Railway. Both roads were previously controlled by the New York Central and the Pennsylvania, and the new company is likewise controlled jointly by these companies.

Morris & Essex.—See Delaware, Lackawanna & Western.

Nashville, Chattanooga & St. Louis.—Brown Brothers & Co., New York, are offering $1,500,000 Nashville, Chattanooga & St. Louis first consodilated 5 per cent bonds at 105, yielding about 4½ per cent on the investment. These bonds are part of a total authorized issue of $20,000,000 bonds of 1888-1928. Out of this authorized issue there is outstanding, including the present issue, $9,108,000. The mortgage securing these bonds is a first lien on the main line from Chattanooga, Tenn., to Hickman, Ky., 322 miles, and on 276 miles of branch lines and is a second mortgage on 142 miles additional main line.

British Women Railway Employees.—Press despatches from London report that the women now being employed in fairly large numbers on the various railroads of England will henceforth be eligible to membership in the National Union of Railwaymen.

Campaign Notes from German South West Africa.—On the entry of the British forces at Windhoek, the capital of German South West Africa, great quantities of railway material were found to have been buried and this was subsequently recovered. The troops found 10 engines with their essential parts removed. The Provost-Marshal issued a notice calling on the inhabitants to restore any government property in their possession, and as a consequence civilians are now returning large quantities of railway stores, which they allege were sold or given to them.